U.S. Department of the Interior
Bureau of Land Management
White River Field Office
220 East Market Street
Meeker, CO 81641

ENVIRONMENTAL ASSESSMENT

NUMBER: CO-110-2007-203-EA

CASE FILE/PROJECT NUMBER: COC-59393, COC-57978, COC-57978, COC-57395, COC-59395, COC-57394

PROJECT NAME: Six (6) BOPCO Yellow Creek Federal Wells

LEGAL DESCRIPTION: Surface locations: T1S, R98W, 6th P.M.
YCF 4-44-1 – SENE Section 4
YCF 11-41-1 – NENE Section 11
YCF 12-32-1 – Lot 7 Section 17
YCF 28-23-1 – NESW section 28
YCF 28-44-1 – SESE Section 28
YCF 32-12-1 – SWNW Section 32

APPLICANT: BOPCO, L.P.

ISSUES AND CONCERNS: Onsites for the proposed wells were conducted October 2 and November 26, 2007. The issues and concerns raised during these onsites are identified and assessed in the environmental consequences sections for the specific resource value.

DESCRIPTION OF PROPOSED ACTION AND ALTERNATIVES:

Background/Introduction: The Project Area for this environmental assessment (EA) is BOPCO's Yellow Creek Field, located about 25 miles west and south of Meeker, Colorado. This field contains a total of 13,004 acres, of which 12,995 acres (99.9 percent) is Federal surface, administered by the Bureau of Land Management (BLM) White River Field Office (WRFO) in Meeker. The remaining acreage, about 16 acres, is State surface, administered by the Colorado Division of Wildlife (CDOW).

It should be noted that a specific APD may state that a proposed total pipeline length is longer than a proposed access road. For purposes of this assessment it is assumed that if a proposed pipeline length is longer than the proposed access road, that portion of the pipeline segment outside the proposed access road would be located within previously disturbed areas associated with existing access routes and/or existing pipeline rights-of-way (ROW). Table 1, below, identifies the proposed new surface disturbance for each proposed well and its associated access road and pipeline as shown on its most current survey plat.

Proposed Action: In 2007, BOPCO, L.P. (BOPCO) submitted to the Bureau of Land Management (BLM) Applications for Permit to Drill (APD) to drill and operate six natural gas wells identified below. BOPCO proposes to drill and operate these six natural gas wells, with associated access roads and pipelines, on Federal surface lands, in the existing Yellow Creek Field. A map of the proposed well locations is contained in Appendix A, Figure 1.

Table 1: Proposed YCF Wells and Estimated New Surface Disturbance

Well No.	Lease No.	Well Pad (Acres)[1]	Access Road and Pipeline[2]		Estimated New Surface Disturbance (Acres)
			Feet	Acres	
YCF 4-44-1	COC 59393	3.74	165	0.11	3.85
YCF 11-41-1	COC 57978	3.69	4,175	2.88	6.57
YCF 12-32-1	COC 57978	3.68	4,260	2.93	6.61
YCF 28-23-1	COC 59395	3.84	2,045	1.41	5.25
YCF 28-44-1	COC 59395	3.57	255	0.18	3.75
YCF 32-12-1	COC 59394	4.43	598	0.41	4.84
Estimated Total New Disturbance		**22.95**	**11,498**	**7.92**	**30.87**

[1] Includes disturbance estimates for materials and topsoil stockpiles and tank battery production facilities.
[2] As shown on individual APD. New pipelines would be buried within the ROW for the proposed access road. The access road ROW would be 30 feet wide.

Off –lease roads and pipelines would be authorized as amendments to the following case files: roads COC67003, gas pipelines COC68980, and water lines COC68981.

Estimated total new surface disturbance for the project would be approximately 31 acres, all of which would be located on BLM-administered Federal surface lands.

Each of the proposed wells and associated access roads and pipelines would be constructed and operated as outlined in the approved APD for each of the proposed wells. In addition to the terms and conditions of BOPCO's existing leases, BOPCO has committed to implementing protection measures that would be applied to specific proposed wells, as needed, to further minimize surface disturbance and potential impacts to specific resources values. These measures are outlined in Table 2.

Table 2: Applicant-Committed Protection Measures for BOPCO's Proposed 6 Wells

Applicant-Committed Protection Measures	Applicable Well Number – YCF-					
	4-44-1	11-41-1	12-32-1	28-23-1	28-44-1	32-12-1
General						
Minimize new surface disturbance by limiting new surface disturbance to that area within a staked area. Temporary staging areas, vehicle parking areas, etc., would be limited to existing disturbed areas. All vehicle traffic would be restricted to existing roads; no cross-country vehicle travel would be conducted.	X	X	X	X	X	X
All disturbed areas would be reclaimed in accordance with the reclamation plan as set out in Appendix B herein and in the Surface Use Plan of the APD filed for each proposed well.	X	X	X	X	X	X

Applicant-Committed Protection Measures	Applicable Well Number – YCF-					
	4-44-1	11-41-1	12-32-1	28-23-1	28-44-1	32-12-1
Restrict travel by the public on access roads determined by the BLM to be inconsistent with existing travel plans or resource management plans. Lockable gates, signs, fence segments, barricades or other forms of deterrents would be constructed and maintained as directed by the BLM.	X	X	X			
Roads would be located to minimize their effect on wetland and riparian areas. Design criteria would include approaching and crossing the channel perpendicular to, and in well-defined, unobstructed and straight segments of the channel. Drainages would be crossed preferably using a low-water crossing.		X				
Any needed fences would be constructed in conformance with BLM Manual H1737-1, as updated. Type-D fences would be constructed to protect reclaimed areas, wetland and riparian areas, or as directed by the BLM. Needed fences would be located so as to minimize livestock, big game and/or wild horse free movement in the Project Area. Fence lines would not be bladed prior to construction. See also reclamation section of this EA for additional information (Appendix B).	X	X	X	X	X	X
During dry periods, fugitive dust from construction and operations activities on well pads, along pipeline and access road ROWs would be controlled by routine watering.	X	X	X	X	X	X
Cultural and Paleontological Resources						
Surveys for paleontological resources would be conducted on Class I and Class II geologic units if they have good, safe outcrops likely to produce scientifically-important fossils prior to any surface-disturbing activities.	X	X	X	X	X	X
If any fossils, human skeletal remains or cultural remains, monuments or sites are unearthed during project operations, all such operations would cease immediately and BLM would be notified. BOPCO would comply with BLM directions.	X	X	X	X	X	X
Invasive, Non-Native Species						
Application of all pesticides and herbicides would be in accordance with BLM Manual H-9011-1 and 9015, as amended, and the approved Pesticide Use Proposal. Application would be under the field supervision of an Environmental Protection Agency-certified pesticide applicator.	X	X	X	X	X	X
All operator, contractors and subcontractors would be required to clean their equipment and vehicles prior to using them in the Project Area.	X	X	X	X	X	X
Areas disturbed by the Proposed Action would be monitored for the presence, extent and trend of invasive, non-native species.	X	X	X	X	X	X
Migratory Birds, Including Raptors						
Minimize disruption of migratory bird nesting activity in mature pinyon-juniper woodlands by scheduling access and pad construction, and where possible, drilling and completion operations to periods outside core nesting season (May 15 to July 15).	X	X	X			
Prevent use by migratory birds of areas expected to store fluids which may pose a risk to such birds. Netting or	X	X	X	X	X	X

Applicant-Committed Protection Measures	Applicable Well Number – YCF-					
	4-44-1	11-41-1	12-32-1	28-23-1	28-44-1	32-12-1
other alternative method acceptable to BLM would be used. Notify BLM 2 weeks prior to installation. Netting would be applied within 24 hours after the drill rig is removed and will be maintained in a fully function condition until the pit is backfilled. Any lethal and non-lethal events involving migratory birds will be immediately reported to the BLM.						
Water Quality						
Utilize appropriate road survey designs to minimize surface disturbance and reduce sedimentation. Employ appropriate guidelines set out in the BLM's 2007 "Gold Book" and standard engineering road designs specified by BLM Manual Section 9113 and industry standards for road shape and drainage features. Culverts and waterbars would be installed according to BLM Manual 9113 standards and sized for the 10-year storm event with no static head and to pass a 25-year event without failing.	X	X	X	X	X	X
Installation of pipelines would involve the following: place pipeline with proposed/existing road ROW; bury the pipeline to a minimum depth of 36 inches; install water bars and/or other sediment barriers to slow runoff and allow for deposition of sediment.	X	X	X	X	X	X
Floodplains, Riparian and Wetlands						
Fences would be constructed to protect natural wetlands and streambanks.						X
Soils						
Minimize travel on roads to that which is essential when soils or road surfaces become saturated to a depth of 3 inches or greater.	X	X	X	X	X	X
Avoid headwalls, midslope locations on steep, unstable slopes, seeps, oil landslides, slopes in excess of 70 percent and areas where the geologic bedding planes or weathering surfaces are inclined with the slope.	X	X	X	X	X	X
Minimize soil erosion and surface runoff through adherence to well-specific stormwater management actions	X	X	X	X	X	X
Vegetation						
When preparing a site, all suitable topsoil would be stripped from the surface and stockpiled separately from other excess materials piles.	X	X	X	X	X	X
Topsoil piles will be protected by reseeding with site-specific native seed mixtures, and covered with erosion control blankets, if appropriate. If the topsoil is stockpiled on slopes exceeding 5 percent, a berm would be constructed below the stockpile.	X	X	X	X	X	X
Forest Management						
In pinyon-juniper woodlands, avoid mature trees suitable as future "seed" trees, minimize removal of trees. Snags, including dead or dying trees, will be avoided within the interior of woodland areas.	X	X	X			X
Trees that must be removed for well pads would be purchased from the BLM. They would then be cut to a maximum stump height of 6 inches and disposed of as follows: trees would be cut into four foot lengths and	X	X	X			X

Applicant-Committed Protection Measures	Applicable Well Number – YCF-					
	4-44-1	11-41-1	12-32-1	28-23-1	28-44-1	32-12-1
removed from the Project Area. Any remaining limbs less than 4 inches diameter would be chipped and scattered on reclaimed areas or scattered off the disturbed area.						
In areas where the pipeline ROWs intersect travel routes, retain enough of the in-place woody material to sufficiently deter travel. Utilize the cleared tree boles that have been limbed, with root wads intact, and place in areas where the use of existing pinyon-juniper stands will assist in the deterrence. Retain enough of these materials to cover 20 percent of the surface area to be closed. Any excess materials other than that needed for the 20 percent cover, will be cut into 4-foot sections and placed along roads to discourage the use of pipeline ROWs for firewood collection. The root wads from the cut sections would be redistributed along the ROW.	X	X	X	X	X	X
Old-growth trees identified by the BLM would not be cut, disturbed or trimmed in any way during road and/or pipeline construction or during any activities undertaken by BOPCO.		X	X			
Wildlife, Terrestrial						
To reduce the extent and intensity of disturbance on mule deer severe winter ranges, no disruptive activities, including but not limited to pad/road/pipeline construction, drilling and completion operations, and installation of production equipment would be allowed between January 1 and April 30.		X	X			

Source: BLM. 1997.

Appendix B outlines the reclamation plan for the six proposed wells. This plan is based on the Surface Use Plan included in the APDs for each proposed well. Reclamation activities would involve both interim and final actions. Interim reclamation refers to measures applied to stabilize disturbed areas and to control runoff and erosion during time periods when application of final reclamation measures are not feasible or practical. Interim reclamation would be implemented on all disturbed areas that are not needed for production activities, estimated to be a minimum of about 50 percent for proposed well pads, and 40 percent for proposed access road and pipeline ROWs. Final reclamation refers to measures that would be applied after well abandonment and at the end of the project. Earthwork for final and interim reclamation would be completed within 6 months of well completion or well plugging (weather permitting). The lifespan of individual producing wells may vary, but is estimated to be about 20 years.

Construction and/or operation actions would be performed to standards included in the BLM and U.S. Forest Service document *Surface Operating Standards and Guidelines for Oil and Gas Exploration and Development* or "Gold Book" (USDI-USDA 2007) and would include the following:

The following lists the proposed actions common to all proposed wells, access roads and pipelines. These actions are taken from the individual APDs and most current site-specific well diagrams:

- Roads would be constructed of native material, graded and maintained at a minimum of once per year. Appendix C provides a typical access road diagram for road shape (i.e. the Embankment and Side Hill Sections).
- Road grade would not exceed 8 percent.
- New road ROWs would be 30 feet wide and running surface would be 18 feet wide.
- Gathering pipelines would be constructed of 6-inch diameter steel segments and would be buried to a minimum depth of 36 inches. They would be located within road ROWs of the proposed access road or existing road; or, within existing pipeline ROWs, as appropriate. Needed water lines be constructed of 3.5-inch diameter poly line and would be buried in the same trench as the gathering pipeline.
- The six proposed wells would be drilled and completed using a two-phase process:
    - The first phase would involve a relatively small drill rig (Lang or its equivalent in size and capacity) using reverse circulation methods to complete surface drilling down to a depth of about 3,500 feet, and to install surface casing. This phase would require a small cuttings pit (having measurements of approximately 15 feet by 40 feet by 12 feet deep). This pit would hold first-phase cutting returns, fresh water liquids and excess circulation cement.
        - The cuttings pit would be constructed on the cut side of each pad. The pit would not be located in a natural drainage or where surface runoff could enter the pit or damage the pit walls.
        - The cuttings pit would be fenced to prevent access for wildlife and unauthorized personnel. The fencing would be installed on three sides of the pit during drilling operations and on the fourth side when the drilling rig moves off location and until the pit is backfilled and reclaimed. In wild horse range, the fence height would not exceed 48 inches. On cattle allotments, the fence would be constructed of four strands of barbed wire.
        - Restoration of the cuttings pit would involve using an excavator to remove as much of the drilling mud as possible, then, using a 50:50 mix of subsoil with fly ash (obtained from a commercial supplier), compact the mixture as layers until the pit is completely filled and level with the well pad.
        - Surface casing would involve cementing the drill hole from the surface to a depth of about 3,500 feet, depending on the specific well.
    - The second phase would involve a larger drill rig (H&P 317 or a skid-mounted rig of equivalent dimensions and capacity) to complete drilling activities down to the target depth. This phase would involve a closed-loop system, involving a series of equipment and dewatering actions resulting in a “dry” location where a reserve pit is not required and drilling fluids are recycled. BOPCO would use a small drill cuttings pit, located on the well pad, having a measurement of approximately 50 feet by 50 feet by 12 feet deep, to hold only the dry cuttings material obtained from drilling. Prior to reclamation, these pits would be cleared of cuttings materials.
    - Approximately 3.9 acre-feet (or 30,000 barrels [bbls]) of water would be needed to drill and complete each proposed well. All fresh water would come from either existing permits from the White River or from commercial municipal permits from the cities of Meeker or Rangely, Colorado. Water would be provided by

water-hauling trucks having a water holding capacity ranging between 100 and 180 bbls. Water would be stored on location in either a tank or from the rig tank.

- To minimize the use of fresh water, drilling water from one well will be cleaned, tested and reused to the maximum extent possible, without causing damage to equipment or resulting in degradation of surface resources. Water needed for fracing purposes during well completion activities could come from BOPCO's "frac" tank water station, located on BOPCO's YCF 32-33-1 well pad in T1N, R98W, Section 32. This pad contains a collection of about 80 tanks capable of supplying water needed for frac actions for a single well. Frac water would be transported from the water station to the proposed well location via an 8-inch polyurethane surface-laid pipeline located within road ROWs. This pipeline would be temporary and be in place for approximately 30 days. Upon completion of frac actions, the water would be recollected at the frac tank water station, cleaned, tested and held for use by the next well scheduled for such activities.
- Production tank batteries would be located immediately adjacent to the well pad at the point adjacent to the pad where the access road enters the pad. The average size of the tank battery site would be approximately 0.3 acres. The tank batteries would be enclosed by a dike of sufficient capacity to contain 110 percent of the storage capacity of the largest tank. BOPCO would maintain the integrity of these dikes as needed.

- BOPCO also would acquire any needed encroachment permits from Rio Blanco County for placement of any pipelines within county ROWs.

Construction and/or operations specific to a particular proposed well, access road, and/or pipeline include the following:

Diversion ditches have been identified as being needed for the proposed YCF 12-32-1 and 32-12-1.

No Action Alternative: Under the No-Action Alternative, the Proposed Action would not be approved. Existing energy activities in the Yellow Creek Field would continue as authorized.

ALTERNATIVES CONSIDERED BUT NOT CARRIED FORWARD: None.

NEED FOR THE ACTION: The purpose of the proposed action is to manage the exploration and development of mineral resources on Public Lands in a manner that avoids, minimizes, reduces, or mitigates potential impacts to other resource values.

PLAN CONFORMANCE REVIEW: The Proposed Action is subject to and has been reviewed for conformance with the following plan (43 Code of Federal Regulations [CFR] 1610.5, BLM 1617.3):

Name of Plan: White River Record of Decision and Approved Resource Management Plan (RMP/ROD).

Date Approved: July 1, 1997.

Decision Number/Page: Page 2-5.

Decision Language: "Make Federal oil and gas resources available for leasing and development in a manner that provides reasonable protection for other resource values."

AFFECTED ENVIRONMENT/ENVIRONMENTAL CONSEQUENCES/ MITIGATION MEASURES:

STANDARDS FOR PUBLIC LAND HEALTH: In January 1997, Colorado BLM approved the Standards for Public Land Health. These standards cover upland soils, riparian systems, plant and animal communities, threatened and endangered species, and water quality. Standards describe conditions needed to sustain public land health and relate to all uses of the public lands. Because a standard exists for these five categories, a finding must be made for each of them in an environmental analysis. These findings are located in specific resource sections below.

CRITICAL ELEMENTS:

AIR QUALITY

Affected Environment: Project Area Climate: Elevations in the Project Area range from 6,030 to 6,870 feet above mean sea level (amsl). The climate of the Project Area is classified as semi-arid continental characterized by low relative humidity and precipitation, abundant clear skies, high evaporation, and large daily temperature ranges.

The temperature and precipitation in the Project Area can be represented by the Little Hills meteorological monitoring station approximately 10 miles west of the Project Area at an elevation of 6,140 feet amsl. Data were collected from 1948 to 1991 (Western Regional Climate Center 2008). The annual temperature varies from a maximum mean monthly temperature of 86˚ F in July to a mean monthly minimum temperature of 3˚ F in January. The Project Area receives about 14 inches of liquid equivalent precipitation annually and 57 inches of snow between October and May. Precipitation is fairly equally distributed from March through October (about an average of 1.3 inches per month), and tends to be less than an inch from November through February. Average monthly and average annual temperature and precipitation are shown in Table 3 below.

Table 3: Project Area Temperature and Precipitation

Month	Temperature (°F)		Precipitation (Inches)			
	Mean Maximum	Mean Minimum	Mean	Maximum	Mean Snowfall	Maximum Snowfall
January	37	3	0.74	1.87	10.8	33.0
February	42	8	0.79	3.09	9.2	30.6
March	48	17	1.24	2.82	11.5	31.7

Month	Temperature (°F)		Precipitation (Inches)			
	Mean Maximum	Mean Minimum	Mean	Maximum	Mean Snowfall	Maximum Snowfall
April	58	24	1.44	3.33	5.1	18.0
May	68	32	1.36	3.23	1.1	11.5
June	79	38	1.11	3.84	0.1	3.0
July	86	45	1.25	3.97	0.0	0.0
August	83	43	1.55	4.50	0.0	0.0
September	76	34	1.17	5.29	0.1	2.2
October	64	24	1.24	4.32	2.4	13.0
November	49	14	0.97	2.31	5.9	35.5
December	39	5	0.95	2.65	10.5	29.5
Annual	**61**	**24**	**13.81**	**20.37**	**56.7**	**208.0**

Sources: Western Regional Climate Center 2008

Project Area Air Quality: National Ambient Air Quality Standards (NAAQS) have been promulgated for the purpose of protecting human health and welfare with an adequate margin of safety. The State of Colorado has adopted the NAAQS with a modification for sulfur dioxide (SO_2). Criteria pollutants for which standards have been set include SO_2, nitrogen dioxide (NO_2), carbon monoxide (CO), particulate matter less than 10 or 2.5 microns in effective diameter (PM_{10} and $PM_{2.5}$), and ozone (O_3). Regional air quality is acceptable based on State of Colorado standards for the protection of human health and the best available data. Rio Blanco Counties are designated as attainment areas, meaning that the concentration of criteria pollutants in the ambient air is less than the NAAQS (CAQCC 2003).

Unfortunately, no air quality data have been collected recently within or very near the project area. The best available air quality data in the general area indicates that the existing air quality is likely within acceptable standards. Table 4 below provides a summary of representative air quality data available for the Piceance Creek area.

Table 4: Existing Air Quality Summary for Piceance Basin Area

Pollutant	Averaging Period					Monitoring Station Location Description
	Annual	24-Hour	8-Hour	3-Hour	1-Hour	
	Ambient Air Average Concentration (ug/m^3)					
O_3	NA	NA	145	NA	NA	Based on CASTNET measurements in Mesa Verde and Canyonlands National Parks
PM_{10}	NA	36	NA	NA	NA	American Soda, Piceance 2003-2005
$PM_{2.5}$	9	23	NA	NA	NA	Grand Junction, Mesa County
NO_2	17	NA	NA	NA	NA	Rural default value based on Southern Ute monitor station near Ignacio (SW Colorado).
CO	NA	NA	1140	NA	1140	American Soda, Piceance 2003-2004
SO_2	11	39	NA	110	NA	Unocal 1983-1984

Background concentration recommended by CDPHE, personal communication N. Chick. 2008.

Regulatory Setting: Under the Prevention of Significant Deterioration (PSD) provisions of the Clean Air Act (CAA) administered by the State of Colorado, incremental increases of specific pollutant concentrations are limited above a legally defined baseline level. Many national parks and wilderness areas are designated as PSD Class I. The area surrounding the Project is

designated as PSD Class II. The Colorado Ambient Air Quality Standards, existing air quality, and PSD increments for Class I and II areas are presented in Table 5, below.

Table 5: Ambient Air Quality

Pollutant	Averaging Period(s)	Colorado Ambient Air Quality Standard ($\mu g/m^3$)	PSD Class II Increments ($\mu g/m^3$)	PSD Class I Increments ($\mu g/m^3$)
SO_2[1]	Annual	15	20	2
	24-hour	100	91	5
	3-hour	700	512	25
NO_2	Annual	100	25	2.5
PM_{10}	24-hour	150	17	8
$PM_{2.5}$	24-hour	35	NA	NA
	Annual	15	NA	NA
CO	8-hour	10,000	None	NA
	1-hour	40,000	None	NA
O_3	8-hour	157	NA	NA

Source: CDPHE 2008
$\mu g/m^3$: micrograms of pollutant per cubic meter of ambient air
[1] SO_2 expressed as allowable increases over an established baseline.

Environmental Consequences of Proposed Action: The proposed surface disturbance and fugitive dust from increased vehicle traffic associated with the proposed wells would affect local air quality by increasing air pollutant emissions. Emission inventories were developed and screening dispersion modeling was performed to assess the potential air quality impacts from the Proposed Action with respect to various criteria. The modeling assessment of the Yellow Creek Field consists of evaluating air quality impacts on sub-grid, near-field, and far-field scales. The EPA-approved SCREEN dispersion model was used to evaluate the near-field impacts from the largest pollutant source, the drill rig engines. This section summarizes the air quality impacts of the Proposed Action.

Emissions: Emission inventories were developed for the Proposed Action. The annual emissions, nitrogen oxides (NO_x), CO, SO_2, coarse particulates with a diameter less than 10 microns (PM_{10}), fine particulates with a diameter less than 2.5 microns ($PM_{2.5}$) and volatile organic compounds (VOC), during the year of construction activities and average long-term operations, are described in detail in Appendix E. Project emissions would be emitted from the following activities and sources:
Well pad and road construction: equipment producing fugitive dust while moving and leveling earth;

- Drilling: vehicles generating fugitive dust on access roads, and drill rig engine exhaust;
- Completion: vehicles generating fugitive dust on access roads and flaring emissions;
- Vehicle and equipment exhaust emissions associated with all development phases;
- Well pad operation: flashing and breathing emissions from condensate tanks; and
- Tailpipe emissions from operational vehicles.

As shown in Table 6 below, most of the emissions would occur during the year of construction, drilling, and completion. The exception would be the VOC emissions from condensate tanks during production.

Table 6: Yellow Creek Proposed Action Pollutant Emissions

Pollutant	Project Emissions (tons/year)		Total
	Well Development	Project Production	Emissions (tons/year)
Criteria Pollutants & VOC			
NO_x	76.49	0.27	76.75
CO	24.18	1.21	25.40
VOC	3.11	394.35	397.46
SO_2	1.35	0.01	1.36
PM_{10}	203.13	25.14	228.28
$PM_{2.5}$	22.19	2.51	24.71
Hazardous Air Pollutants			
Benzene	0.00	1.89	1.89
n-Hexane	0.00	5.52	5.52

Near-Field Impacts: Drill rig emissions would be the largest point source of pollutants for the Project Area. Note there are no models that can accurately predict VOC impacts. Also PM_{10} impacts would be temporary at any one location and widespread throughout the Project Area. It should be noted that the drill rig emission impacts from the project activities were evaluated using the SCREEN3 pollutant dispersion model to evaluate impacts near the biggest pollutant source – NO_x emissions from drill rig engines. While a drill rig engine would operate for approximately 30 days, the average NO_x emissions would be 22.4 lbs/hour. The SCREEN3 results indicated that the maximum NO_2 ambient air impact would be 35.9 micrograms per cubic meter of ambient air ($\mu g/m^3$). When added to the background value of 17 $\mu g/m^3$, the total 52.9 $\mu g/m^3$, would be 52.9 percent of the NO_2 NAAQS of 100 $\mu g/m^3$.

PM_{10} and $PM_{2.5}$ ambient pollutant levels would be temporarily elevated during construction activities and also would be associated with increased vehicle traffic along project roads. However, specific actions under the Proposed Action, including routine road watering when the roads are dry would reduce the emission of fugitive dust from access roads in the Project Area.

Environmental Consequences of the No Action Alternative: Under the No Action Alternative, the proposed wells and supporting infrastructure would not be approved. Thus under the No Action Alternative, ambient air quality resulting from ongoing energy development activities in the Project Area would remain at the current levels.

Mitigation: The following mitigation measures would further reduce impacts to air quality and should be incorporated as Conditions of Approval in the final authorizations:

All access roads would be treated with water and/or a dust suppressant during construction and drilling activities so that there is not a visible dust trail behind vehicles. All vehicles would abide by public speed restrictions during all activities. Company-set speed restrictions will not exceed 15 miles per hour. If water is used as a dust suppressant, there should be no traces of oil or

solvents in water. Only water needed for abating dust should be applied. Dust abatement should not be used as a water disposal option under any circumstances.

AREAS OF CRITICAL ENVIRONMENTAL CONCERN:

Affected Environment: An Area of Critical Environmental Concern (ACEC) is defined in Federal Land Policy and Management Act (FLPMA), Public Law 94-579, Section 103(a) as an area within the public lands where special management is required to protect and prevent irreparable damage to important historic, cultural, and scenic values; fish and wildlife resources or other natural systems or processes; or to protect human life and safety from natural hazards. The management of ACECs is focused on the resource or natural hazard of concern and varies considerably from area to area. To be considered for designation as an ACEC, an area must meet the requirements of relevance and importance as described in 43 CFR 1601.7.2.

The BLM designated the Duck Creek ACEC in its White River RMP/ROD to protect and enhance its relevant and important values, which include cultural resources and threatened and endangered plants. Approximately 1,000 acres (or 29 percent) of the 3,430-acre Duck Creek ACEC overlap the Project Area.

Environmental Consequences of Proposed Action: If the Proposed Action were implemented, no development would occur in the portion of the Duck Creek ACEC that overlaps the Project Area. As such, there would be no direct impacts to relevant and important values for which the ACEC was designated. Based on the location of BOPCO's proposed wells, no additional access would be created into the Duck Creek ACEC; therefore, there would be no indirect impacts to the relevant and important values for which the ACEC was designated.

Environmental Consequences of the No Action Alternative: Under the No Action Alternative, the proposed wells and supporting infrastructure would not be approved. Thus under the No Action Alternative, impacts to the Duck Creek ACEC resulting from ongoing energy development activities in the Project Area would remain unchanged from current levels and trends.

Mitigation: Because there would be no impacts to the Duck Creek ACEC, there are no recommended mitigation measures.

CULTURAL RESOURCES

***Affected Environment*:** Proposed BOPCO YCF 28-44-1 well, access and well tie pipeline: The proposed well pad location, access and well tie pipeline have been inventoried at the Class III (100% pedestrian) level as the YCF 28-44-2 (Pagano and Polk 2006, Compliance Dated 3/28/2006) with no new cultural resources identified in the inventoried area. However there is a potential for undetected resources within 308 meters of the well location.

Proposed BOPCO YCF 28-23-1 well location, access, and well tie pipeline route: The Proposed well location, access road and well tie pipeline routes have been inventoried at the Class III (100% pedestrian) level (Polk 2007, Compliance Dated 2/6/2008) with no new cultural resources identified in the inventoried area. However there is a potential for undetected resources within 308 meters of the well location.

Proposed BOPCO YCF 32-12-1 well, access and well tie pipeline: The proposed well pad location, access and well tie pipeline route have been inventoried at the Class III (100% pedestrian) level as the YCF 32-12-1 (Pagano and Polk, 2006, Compliance Dated 3/28/2006) with no cultural resources identified in the inventoried area. However, there is a potential for undetected resources within 308 meters of the well location.

Proposed BOPCO YCF 4-44-1 well, access, and well tie pipeline: The proposed well location, access route and well tie pipeline have been inventoried at the Class III (100% pedestrian) level (Johnson 2006, Compliance Dated 11/1/2006) with no new cultural resources identified in the inventoried area. However there is a potential for undetected resources within 308 meters of the well location

Proposed BOPCO YCF 11-41-1 well location, access and well tie pipeline route (formerly 11-41-2): The proposed well pad location, access and well tie pipeline route have been inventoried at the Class III (100% pedestrian) level (Pagano and Polk 2006, Compliance Dated 3/28/2006) with one site located along the proposed access road and well tie pipeline route. However there is a potential for undetected resources within 308 meters of the well location.

Proposed BOPCO YCF 12-32-1 well location, access and well tie pipeline route (formerly12-32-2): The proposed well pad location, access and well tie pipeline route have been inventoried at the Class III (100% pedestrian) level (Pagano and Polk 2006, Compliance Dated 3/28/2006) with one site located along the proposed access road and well tie pipeline route. However there is a potential for undetected resources within 308 meters of the well location.

Environmental Consequences of the Proposed Action: Proposed BOPCO YCF 28-44-1 well location, access and well tie pipeline route: the proposed well location, access and well tie pipeline route will not impact any known cultural resources. However, any previously undetected resources located within 308 meters of the inventoried area could be adversely impacted by vibrations associated with construction, unauthorized collection due to increased access into the area and increased visitation to the area.

Proposed BOPCO YCF 28-23-1 well location, access and well tie pipeline route: the proposed well location, access and well tie pipeline route will not impact any known cultural resources. However, any previously undetected resources located within 308 meters of the inventoried area could be adversely impacted by vibrations associated with construction, unauthorized collection due to increased access into the area and increased visitation to the area.

Proposed BOPCO YCF 32-12-1 well location, access and well tie pipeline route: the proposed well location, access and well tie pipeline route will not impact any known cultural resources. However, any previously undetected resources located within 308 meters of the inventoried area

could be adversely impacted by vibrations associated with construction, unauthorized collection due to increased access into the area and increased visitation to the area.

Proposed BOPCO YCF 4-44-1 well location, access and well tie pipeline route: the proposed well location, access and well tie pipeline route will not impact any known cultural resources. However, any previously undetected resources located within 308 meters of the inventoried area could be adversely impacted by vibrations associated with construction, unauthorized collection due to increased access into the area and increased visitation to the area.

Proposed BOPCO YCF 11-41-1 well location, access and well tie pipeline route: the proposed well location, access and well tie pipeline route will not impact any known cultural resources. However, any previously undetected resources located within 308 meters of the inventoried area could be adversely impacted by vibrations associated with construction, unauthorized collection due to increased access into the area and increased visitation to the area.

BOPCO YCF 12-32-1 well location, access and well tie pipeline route: the proposed well location, access and well tie pipeline route will not impact any known cultural resources. However, any previously undetected resources located within 308 meters of the inventoried area could be adversely impacted by vibrations associated with construction, unauthorized collection due to increased access into the area and increased visitation to the area.

Environmental Consequences of the No Action Alternative: There would be no new impacts to cultural resources under the No Action Alternative.

***Mitigation*:** Proposed well locations, access and well tie pipeline routes: The operator is responsible for informing all persons who are associated with the project operations that they will be subject to prosecution for knowingly disturbing historic or archaeological sites, or for collecting artifacts. If historic or archaeological materials are uncovered during any project or construction activities, the operator is to immediately stop activities in the immediate area of the find that might further disturb such materials, and immediately contact the authorized officer (AO). Within five working days the AO will inform the operator as to:

- whether the materials appear eligible for the National Register of Historic Places
- the mitigation measures the operator will likely have to undertake before the site can be used (assuming in situ preservation is not necessary)
- a timeframe for the AO to complete an expedited review under 36 CFR 800-11 to confirm, through the State Historic Preservation Officer, that the findings of the AO are correct and that mitigation is appropriate.

If the operator wishes, at any time, to relocate activities to avoid the expense of mitigation and/or the delays associated with this process, the AO will assume responsibility for whatever recordation and stabilization of the exposed materials may be required. Otherwise, the operator will be responsible for mitigation cost. The AO will provide technical and procedural guidance for the conduct of mitigation. Upon verification from the AO that the required mitigation has been completed, the operator will then be allowed to resume construction.

Pursuant to 43 CFR 10.4(g) the holder of this authorization must notify the AO, by telephone, with written confirmation, immediately upon the discovery of human remains, funerary items,

sacred objects, or objects of cultural patrimony. Further, pursuant to 43 CFR 10.4(c) and (d), you must stop activities in the vicinity of the discovery and protect it for 30 days or until notified to proceed by the authorized officer.

INVASIVE, NON-NATIVE SPECIES

Affected Environment: The entire Project Area falls within a BLM-designated "weed free zone" (BLM 1997). The BLM designated approximately 497,900 acres of "weed free zones" in three areas of the WRFO. Weed management in these areas are emphasized through cooperation with private land owners and county and State governments (BLM 1997).

Noxious weeds known to occur or historically known to occur in the Piceance Basin include Russian knapweed (*Acroptilon repens*), spotted knapweed (*Centaurea maculosa*), leafy spurge (*Euphorbia esula*), perennial pepperweed (*Lepidium latifolium*), and cheatgrass (*Bromus tectorum*). The invasive species cheatgrass (*Bromus tectorum*) occurs throughout the Project Area.

Russian and spotted knapweeds occur along some of the existing roads in the Project Area. Leafy spurge has been eradicated from Yellow Creek, but may still occur in the Project Area. Perennial pepperweed is confined to the upper reaches of Duck Creek, and may also occur in the Project Area. Cheatgrass occurs throughout the Project Area, primarily as a result of unrevegetated earthen disturbance associated with previous road construction, pipelines, and well locations.

Environmental Consequences of Proposed Action: Surface disturbance of approximately 31 acres would allow for the introduction and possible expansion of invasive and noxious weed species in the Project Area. Roads provide a major conduit for the spread of exotic plants into natural areas, particularly in arid and semiarid landscapes of the American West (Gelbard and Belnap 2003). Clearing of vegetation and soils, addition of fill, and grading of roads and well pads could create areas of deep, bare soil that would be susceptible to exotic seed establishment (Trombulak and Frissell 2000). Specific negative effects of noxious and invasive weeds can include: 1) reduction in the overall visual character of an area; 2) competition with, or elimination of, native plants; 3) reduction or fragmentation of wildlife and threatened and endangered plant habitats; and 4) increased soil erosion (Gelbard and Belnap 2003).

Specific actions set out under the Proposed Action, including revegetation of disturbed areas through implementation of the Reclamation Plan (refer to Appendix B), would reduce impacts from invasive, non-native weed species in the Project Area. Successful interim reclamation would reduce by 15 acres the estimated total initial surface disturbance of 31 acres. As such, long-term surface disturbance in the Project Area would be approximately 16 acres for the life of the project (LOP). BOPCO has also committed to several protection measures related to weed control in the BLM-designated weed free zone (refer to Table 2). These measures include cleaning equipment prior to entering weed free zones, monitoring disturbed areas for weed species, and following appropriate BLM guidance related to herbicide application. Assuming

successful implementation of these protection measures, the potential impacts described above would be further reduced.

Environmental Consequences of the No Action Alternative: Under the No Action Alternative, the proposed wells and supporting infrastructure would not be approved. Thus under the No Action Alternative, impacts from invasive and noxious weeds resulting from ongoing energy development activities in the Project Area would remain unchanged from current levels and trends.

Mitigation: The operator will be required to monitor the project area for the life of the project and eradicate all noxious and invasive species which occur on site using materials and methods approved in advance by the Authorized Officer.

MIGRATORY BIRDS, INCLUDING RAPTORS

Affected Environment: The Migratory Bird Treaty Act (MBTA) of 1918 (16 U.S.C. 703 et seq.), as amended, was implemented for the protection of migratory birds. Unless permitted by regulations, the MBTA makes it unlawful to pursue, hunt, kill, capture, possess, buy, sell, purchase, or barter any migratory bird, including the feathers or other parts, nests, eggs, or migratory bird products. In addition to the MBTA, Executive Order 13186 sets forth the responsibilities of Federal agencies to further implement the provisions of the MBTA by integrating bird conservation principles and practices into agency activities and by ensuring that Federal actions evaluate the effects of actions and agency plans on migratory birds.

Pinyon-juniper woodlands support the largest variety of nesting bird species of any upland vegetation cover type in the western United States. Survey tallies in pinyon-juniper woodlands have been similar in species density to those conducted in the best riparian and other vegetation cover types (CPIF 2000). There are numerous migratory birds that occupy the Project Area's pinyon-juniper woodlands and big sagebrush shrublands, including several species identified as Priority Species by Colorado Partners in Flight (CPIF). CPIF is a cooperative partnership among Federal, State, and local government agencies as well as public organizations and individuals organized to emphasize the conservation of birds not covered by existing conservation initiatives. The following species have been identified as high priority by CPIF in pinyon-juniper and sagebrush habitats on the Colorado Plateau and are widely distributed at appropriate densities in the Project Area: black-chinned hummingbird (*Archilochus alexandri*), gray flycatcher (*Empidonax wrightii*), pinyon jay (*Gymnorhinus cyanocephalus*), juniper titmouse (*Baeolophus ridgewayi*), black-throated gray warbler (*Dendroica nigrescens*), and Brewer's sparrow (*Spizella breweri*) (CPIF 2000). In addition to the infrequently encountered Williamson's sapsucker (*Sphyrapicus thyroideus*) (woodlands) and Virginia's warbler (*Vermivora virginiae*) (riparian shrubs along Yellow Creek), most of the species above and several of the raptors discussed below are also named as Species of Conservation Concern by the U.S. Fish and Wildlife Service (USFWS) (USFWS Migratory Bird Strategic Plan 2004-2014).

Similar to the migratory bird species discussed above, all raptor species and their nests are protected from take or disturbance under the MBTA. Potential raptor nesting habitat consists

primarily of mature and old growth stands of pinyon and juniper woodlands. Additionally, rock outcrops/cliffs provide potential raptor nest sites, but suitable rock nesting substrate is localized and confined to the larger drainage valleys within the Project Area. Raptor species with the potential to nest in or within ¼ mile of the Project Area are listed below in Table 8.

Table 8: Raptor Species and Their Associated Nesting Habitat Potentially Occurring in or within ¼ Mile of the Project Area

Species	Scientific Name	Nesting Habitat
American Kestrel	*Falco sparverius*	Cliffs
Cooper's Hawk	*Accipiter cooperii*	Pinyon-juniper
Golden Eagle	*Aquila chrysaetos*	Cliffs
Northern Harrier	*Circus cyaneus*	Grasslands, marshes
Great-horned owl	*Bubo virginianus*	Pinyon-juniper, cliffs
Prairie Falcon	*Falco mexicanus*	Cliffs
Red-tailed Hawk	*Buteo jamaicensis*	Cliffs, pinyon-juniper
Northern goshawk	*Accipiter gentillis*	Pinyon-juniper
Sharp-shinned Hawk	*Accipiter striatus*	Pinyon-juniper
Long-eared owl	*Asio otus*	Pinyon-juniper
Northern saw-whet owl	*Aegolius acadicus*	Pinyon-juniper
Northern pygmy owl	*Glaucidium californicum gnoma*	Pinyon-juniper

Source: B&A 2007a, b and c.

A number of accipitrine hawk and woodland owl nests have been located by BLM and previous consultant-conducted surveys in the Project Area. These surveys have been project-driven and are limited in extent, but have documented nesting activity throughout the Project Area's pinyon-juniper woodlands by Cooper's hawk, northern goshawk, and long-eared owl. Red-tailed hawk, great-horned owl, and golden eagle cliff nest sites are confined to the major drainages. Nests found subsequent to these surveys would, depending on status, be subject to Conditions of Approval that implement avoidance measures (relocation of surface facilities) and the application of timing limitations while birds are nesting.

Ground-based raptor nest inventories were conducted in the Project Area by Buys & Associates (B&A) in July, August, September and October of 2007 (B&A 2007a; B&A 2007b; B&A 2007c; and, B&A 2007d). Nesting surveys that satisfy current WRFO protocols were conducted during April 2008 (B&A 2008). These surveys revealed no raptor nests (active or inactive) or incidental raptor sightings for the proposed six wells involved in this project (*Ibid*).

Environmental Consequences of Proposed Action: The intensity of impacts from the Proposed Action on migratory birds that utilize the Project Area would be dependent upon seasonal timing of construction, drilling, and completion activities. If these activities were to be conducted in the late fall, many of the migratory species would have left the Project Area for wintering grounds. Surface disturbance, visual, and noise-related impacts (e.g., direct loss and

fragmentation of habitat, temporary displacement, and avoidance of disturbed sites) during this time would not impact most individual birds or nesting locations. If construction, drilling, and completion activities were to occur during the spring or summer months, the Proposed Action could result in temporary displacement from nesting habitats, disrupt ongoing nest efforts, or deter nest establishment.

The intensity of impacts from the Proposed Action on migratory birds that utilize the Project Area would also be dependent upon the location of proposed development in the Project Area. Adverse impacts to migratory birds related to the construction of well pads in pinyon-juniper woodlands (YCF 4-44-1, 11-41-1 and 12-32-1) would be expected to have a greater effect on migratory birds than those well pads located on stony foothills in the western portion of the Project Area (YCF 28-23-1, 28-44-1, and 32-12-1). The direct removal and fragmentation of about 28 acres of pinyon-juniper woodlands would result in an overall 0.3 percent decrease in the amount of pinyon-juniper woodlands in the Project Area.

Specific actions under the Proposed Action, including applicant-committed protection measures, would reduce both direct and indirect impacts to migratory birds. Successful reclamation, in conjunction with implementation of a weed control plan, would establish conditions conducive to the redevelopment of shrub or woodland habitats in the long or very extended (i.e., woodlands) terms. Successful interim reclamation would reduce by 15 acres the estimated total initial surface disturbance of 31 acres. As such, long-term surface disturbance in the Project Area would involve approximately 16 acres for the LOP.

Similar to impacts to migratory birds discussed above, implementation of the Proposed Action could affect nesting and breeding raptors that may utilize the Project Area. Direct and indirect impacts to raptors may include temporary displacement from suitable habitats during the breeding season due to increased noise levels and visual disturbances on the landscape, and a reduction in habitat for prey species caused by direct habitat loss and fragmentation.

Surface-disturbing activities or areas with concentrated human activity in close proximity (i.e., ¼-mile) to an active raptor nest could lead to temporary displacement from nesting sites, avoidance of affected areas, and deterrence from establishing other nesting sites. Displacement could lead to nest failure or nest abandonment, thereby affecting the breeding pair and its annual productivity. Steidl and Anthony (2000) suggest that the greatest energetic costs from disturbance occur in nestlings, potentially decreasing overall reproductive success. Displacement could also lead to increased use of adjacent habitats, which could lead to increased inter- and intra-specific competition for resources. As increased noise levels and visual disturbances associated with construction and drilling activities would be relatively short-term as compared to the LOP, displacement to adjacent habitats from these activities would be temporary in nature and thus would not likely alter the productivity of potential raptor populations within the Project Area. Further, adherence to surface occupancy restrictions and seasonal timing limitations for raptors, as outlined by the White River RMP/ROD (BLM 1997), would minimize disturbances to breeding raptors.

In addition, total surface disturbance associated with the Proposed Action would result in the direct loss of approximately 31 acres of habitat for raptor prey species such as mammals,

songbirds, and reptiles. Rodriguez-Estrella et al. (1998) identify loss or fragmentation of habitat for prey species as a contributor to raptor population declines. Increased traffic on Project Area roads could also increase the potential for vehicle collisions with carrion-feeding raptors.

Specific actions under the Proposed Action, including applicant-committed protection measures, would reduce both direct and indirect impacts to raptors. Successful reclamation, in conjunction with implementation of a weed control plan, could reestablish raptor and prey species' habitat over time. Successful interim reclamation would reduce by 15 acres the estimated total initial surface disturbance of 31 acres. As such, long-term surface disturbance in the Project Area would be approximately 16 acres for the LOP.

Environmental Consequences of the No Action Alternative: Under the No Action Alternative, the proposed wells and supporting infrastructure would not be approved. Thus under the No Action Alternative, impacts from energy development on migratory birds, including raptors, would remain unchanged from current levels and trends.

Mitigation: To further minimize impacts to migratory birds, including raptors, the following actions should be incorporated as Conditions of Approval in the final authorizations:

Prior to surface-disturbing activities, BOPCO and/or their contractors will determine and report, consistent with BLM White River Field Office raptor nest survey protocols, if active/occupied raptor nests are present within ¼ mile of proposed development sites. Nesting activity that has potential to be adversely influenced by well or access development will be subject to BLM-imposed Conditions of Approval that meet the intent of appropriate nest protection stipulations NSO-02/03 and TL-01/03 as established in the 1997 White River Resource Management Plan

To minimize the potential for vehicle collisions with raptors, BOPCO will advise project personnel regarding appropriate speed limits in the Project Area, and CDOW would be contacted regarding the presence of carrion within or along roadways.

THREATENED, ENDANGERED, AND SENSITIVE ANIMAL SPECIES (includes a finding on Standard 4)

Affected Environment: In accordance with the Endangered Species Act (ESA), the BLM must ensure that any Federal action to be authorized, funded, or implemented would not jeopardize the continued existence of Federally-listed species or adversely modify their critical habitat. It is the BLM's current policy that candidate, State-listed, and sensitive species are also managed to prevent a future Federal listing as threatened or endangered.

Special status species that have the potential to occur within the Project Area or be affected by development activities within the Project Area are discussed below. Appendix F provides a summary of special status animal species and their potential to occur in the Project Area.

The following special status species either have the potential to occur within the Project Area or be affected by development activities within the Project Area: Townsend's big-eared bat

(*Plecotus townsendii*), fringed myotis (*Myotis thysanodes*), Yuma myotis (*Myotis yumanensis*), bald eagle (*Haliaeetus leucocephalus*), northern goshawk (*Accipiter gentilis*), bonytail (*Gila elegans*), Colorado pikeminnow (*Ptychocheilus lucius*), humpback chub (*Gila cypha*), and razorback sucker (*Xyrauchen texanus*). Individual discussions of these species' affected environments are provided below.

Townsend's Big-eared Bat: This bat is designated as a BLM sensitive species by the Colorado BLM and as a State species of special concern by CDOW (BLM 2007a). The species is found throughout Colorado except on the eastern plains. Its distribution seems to be determined by the availability of roost sites with suitable temperatures (CDOW 2007b).

Townsend's big-eared bats are typically found near forested areas. Caves, mines, and structures in woodlands are used for day roosting and winter hibernation. Females congregate in nursery colonies and typically give birth to one young each year. Populations, especially in the nursery and hibernaculum, are highly susceptible to disturbance and have been reported to be declining. Townsend's big-eared bats eat flying insects, particularly moths, and individuals are often seen foraging along the edge of vegetation. This bat may use a night roost and feed a second time before returning to its day roost (CDOW 2007b).

Although no Townsend's big-eared bats have been identified within the Project Area, pinyon-juniper woodlands and suitable rock crevices provide potential roosting sites and foraging opportunities for this species.

Fringed Myotis: This bat species is designated as a BLM sensitive species by the Colorado BLM (BLM 2007a). The fringed myotis is a small bat that is found in coniferous forests and woodlands at moderate elevations in Colorado. The species roosts in rock crevices, caves, mines, and trees, and is known to hibernate in caves. Female fringed myotis commonly gather in nursery colonies of several hundred individuals, while males are solitary as the young are reared. Females generally give birth to a single offspring during the summer. Beetles, which are plucked from vegetation or the ground, are the major prey item of the fringed myotis. They forage along water, above shrubs and woodlands, or low over meadows (CDOW 2007b).

Although no fringed myotis have been identified within the Project Area, pinyon-juniper woodlands and suitable rock crevices provide potential roosting sites and foraging opportunities for this species.

Yuma Myotis: The Yuma myotis is designated as a BLM sensitive species by the Colorado BLM (BLM 2007a). In Colorado, this bat occurs at moderate elevations in valleys on the western slope, in the San Luis Valley, and on the eastern slope north to the vicinity of Colorado Springs (CDOW 2007b).

The Yuma myotis is a species of semiarid canyon-lands and mesas, but it appears to be more closely tied to water than other bats in Colorado. Typical habitats are in pinyon-juniper woodlands and riparian woodlands in semi-desert valleys. During the day, the bat roosts in rock crevices, caves, mines, and swallow's nests. Night roosts typically are in similar shelters (Fitzgerald et al. 1994). Female Yuma myotis commonly gather in nursery colonies of several

thousand individuals, while males are solitary as the young are reared. Females generally give birth to a single offspring during late spring or early summer. They forage low over water on aquatic insects including moths, flies and beetles, leafhoppers, caddis flies, lacewings, and crane flies (CDOW 2007b).

Although no Yuma myotis have been identified within the Project Area, pinyon-juniper woodlands and suitable rock crevices near surface water provide potential roosting sites and foraging opportunities for this species.

Bald Eagle: Under the authority of the ESA, the USFWS delisted the bald eagle in the lower 48 States from the Federal list of endangered and threatened wildlife, effective August 8, 2007 (72 FR 37346). The species is currently protected by the MBTA and by the Bald and Golden Eagle Protection Act of 1940 (16 U.S.C. 668a-668d), as amended. The bald eagle is also designated as State threatened by CDOW (CDOW 2007a).

Bald eagle wintering habitat is typically associated with food source concentrations. These areas include major rivers that remain unfrozen so that fish and waterfowl are available, and near ungulate winter ranges that provide carrion. Roadside carrion is one of the bald eagle's primary winter food sources. Bald eagles may be sensitive to human activity and thus may avoid areas where construction activities occur.

Bald eagles forage opportunistically for carrion and small mammals across the Piceance Basin, including the Project Area, from November through March. No bald eagle special-use habitats have been identified within the Project Area. The CDOW has identified concentrated winter use along the Piceance Creek corridor, approximately 2.5 miles east of the Project Area. A number of bald eagle winter roost and nest sites are also located in mature cottonwood gallery forests along the White River, approximately 17 miles north of the Project Area.

Northern Goshawk: The northern goshawk is designated as a BLM sensitive species by the Colorado BLM. It is a permanent, uncommon resident across most of Colorado.

In Colorado, the northern goshawk is normally associated with high elevation coniferous and aspen forests. However, nesting goshawk occur at low densities throughout the lower elevation woodland types administered by BLM's WRFO. Summering birds are most frequently observed at elevations above 7,100 feet where Douglas-fir occurs as pure stands or as smaller inclusions among pinyon-juniper woodlands. Over the past 30 years, a dozen or more nests have been found in Piceance Basin's mature pinyon-juniper woodlands as low as 6,500 feet. Based on these instances, favored goshawk nesting sites appear to be characterized by interior, mid-slope positions in larger tracts of mature woodlands with northerly aspects. However, in at least two instances, active nests have been located on a stand's margin, including a narrow residual stringer of trees in a large pinyon-juniper chaining.

Colorado River System Endangered Fish Species: The endangered Colorado River fish, which include the bonytail, Colorado pikeminnow, humpback chub, and razorback sucker, were once abundant in the upper and lower reaches of the Colorado River Basin. Today, their distributions are limited to a small portion of their historic habitats. Habitats for these species include

backwaters, sloughs, oxbow lakes, seasonally inundated floodplains, and reservoirs. These fish are threatened with extinction due to the cumulative effects of environmental impacts that have resulted in habitat loss (including alterations to natural flows and changes to temperature and sediment regimes, proliferation of nonnative introduced fish, and other man-made induced disturbances such as dams) (59 FR 13374). Although streams within the Project Area do not provide habitat for these species, USFWS-designated critical habitat for the Colorado pikeminnow is located approximately 16.7 miles downstream of the Project Area in the White River (where Yellow Creek drains into the White River) (USFWS 2008). In addition, critical habitats for the bonytail, humpback chub, and razorback sucker have been designated further downstream in portions of the White and Green Rivers, and their respective 100-year floodplains (USFWS 2008).

Environmental Consequences of Proposed Action: For the purposes of this EA, impacts to the Townsend's big-eared bat, fringed myotis, and Yuma myotis are analyzed collectively, as these bat species are all affected by activities that eliminate or reduce habitat values for day roosts, hibernacula, and foraging and refuge areas. Implementation of the Proposed Action could alter potential existing habitat for these species near and within the Project Area, primarily in pinyon-juniper woodlands and crevices of rock cliffs. Increased noise levels from traffic and construction operations could directly impact roosting sites, and could potentially cause temporary displacement, reduced foraging opportunities, or abandonment of these areas. However, as habitat for these species is widespread throughout Colorado, the Proposed Action may affect individual bats, but would not likely result in a trend towards Federal listing of the three aforementioned bat species. BLM wildlife staff attending the on-site inspections routinely minimizes the involvement of mature woodlands that are likely to support habitats or features best suited for bat roosts (e.g., cavities and other deformities in larger diameter trunks and limbs). To the extent practicable, development features are adjusted or realigned to minimize adverse modifications to both stand extent and continuity.

As no development is proposed within ½ mile of Piceance Creek or the White River corridor, the Proposed Action would have "no effect" on bald eagles that potentially roost in these areas. Within the Project Area, construction of proposed well pads and associated roads and pipelines during the winter could result in the temporary displacement of bald eagles from potential winter foraging habitats. Surface-disturbing activities would also result in the direct loss of approximately 31 acres of prey species' habitat, thus decreasing the abundance of upland prey species in the Project Area. Further, increased traffic on area roads could also increase the potential for vehicle collisions with carrion-feeding eagles.

Specific actions under the Proposed Action, including applicant-committed protection measures, would reduce both direct and indirect impacts to bald eagles. Successful reclamation, in conjunction with implementation of a weed control plan, could reestablish some upland bald eagle foraging habitat over time. Successful interim reclamation would reduce by 15 acres the estimated total initial surface disturbance of 31 acres. As such, long-term surface disturbance in the Project Area would be approximately 16 acres for the LOP. Based upon this information and because no bald eagles have been observed in the Project Area, the Proposed Action would not likely reduce the viability of bald eagles within the Project Area.

The northern goshawk is a reclusive species that prefers minimal contact with humans (Wheeler 2003). As such, potential impacts to breeding pairs disturbed by project-related development could include direct habitat loss or degradation, reduction of prey-base, and nest and territory abandonment due to increased noise levels and human presence. These disturbances could impact a breeding pair's productivity for that year, create a loss of nesting potential, or cause temporary displacement or avoidance of the area. Additional impacts could include habitat fragmentation and a loss of foraging/hunting opportunities. Raptor nest surveys conducted in April 2008 revealed no evidence of northern goshawk nesting activity in areas potentially influenced by development activity (B&A 2008). In the event nesting goshawk are found prior to surface-disturbing activity or prior to initiating development activities that would disrupt nesting functions in subsequent years, adherence to surface occupancy restrictions and seasonal timing limitations for raptors, as outlined by the White River RMP/ROD (BLM 1997), would minimize disturbances to breeding and nesting northern goshawks.

Specific actions under the Proposed Action, including applicant-committed protection measures, would also reduce both direct and indirect impacts to northern goshawks. Successful reclamation, in conjunction with implementation of a weed control plan, could reestablish nesting and foraging habitat over time. As such, residual surface disturbance in the Project Area would be approximately 16 acres for the LOP. Based on reclamation efforts and the nature of impacts described above, Proposed Action would not likely result in a trend towards Federal listing of the northern goshawk.

For the purposes of this EA, impacts to the endangered Colorado River fish are analyzed collectively, as these species are all affected by activities that deplete and/or degrade the flow of downstream waters to the Upper Colorado River Basin, including those portions that contain USFWS-designated critical habitat. Implementation of development activities in the Project Area would primarily affect the Colorado River fish and their USFWS-designated critical habitats by depleting water from the Upper Colorado River Basin. Depletions can reduce the ability of the White and Green Rivers to create and maintain the physical habitat (areas inhabited or potentially habitable to the Colorado River fish for use of spawning, development of fish larvae, feeding, or serving as corridors between these areas) and the biological environment. Water depletions can also contribute to alterations in flow regimes that favor non-native fish.

In order to address depletion (and other) impacts on the Colorado River fish, a Recovery Implementation Program for Endangered Fish Species in the Upper Colorado River Basin (Recovery Program) was initiated on January 22, 1988. Under the 1988 Recovery Program, any water depletions from tributary waters within the Colorado River drainage are considered to "*jeopardize the continued existence"* of these fish. In order to further define and clarify the recovery processes in the Recovery Program, a Section 7 agreement was implemented on October 15, 1993, by Recovery Program participants. Incorporated into this agreement is a Recovery Implementation Program Recovery Action Plan (RIPRAP). The RIPRAP identifies actions currently required to recover the endangered fish species in the most expeditious manner. Included in the RIPRAP was the requirement that a one-time depletion fee would be paid to help support the Recovery Program for all non-historic water depletions (i.e., occurring after January 1988) from the Upper Colorado River Basin. The depletion fee of $17.79 per acre-foot, as of October 1, 2007, was intended to be the reasonable and prudent alternative to avoid jeopardy to

the endangered fishes by depletions to the Upper Colorado River Basin (USFWS 2007, as amended). In 1995, the USFWS eliminated the water depletion fee for non-historical water depletions (permitted after January 1988) from the Upper Colorado River Basin of 100 acre-feet or less (USFWS 1995, as amended).

In May 1994, BLM Colorado prepared a Programmatic Biological Assessment (PBA) that addressed water-depleting activities associated with BLM's management programs in the Colorado River Basin. Because the terms of that Programmatic Consultation will soon be exceeded, BLM Colorado has recently submitted an updated PBA that specifically addresses Upper Colorado River depletions attributable to the BLM's Fluid Mineral Program in western Colorado. Water depletions considered in BLM's Biological Assessment includes water used for access road dust abatement, hydrostatic testing of newly constructed flow and trunk pipelines, and the drilling and completion of wells. The average annual depletion value being analyzed will be derived from the number of new oil and gas wells drilled from October 2007 through September 2008. This collective annual depletion figure will form the basis for a one-time fee paid to the National Fish and Wildlife Foundation to help fund the Upper Colorado River endangered fish program—an established strategy that is expected to comply with the reasonable and prudent alternative and provide the means to avoid jeopardy from water depletions attributable to the development of federal oil and gas reserves and federally connected actions.

Each of the proposed wells identified in the Proposed Action, may require up to 3.9 acre-feet for drilling and completion activities, for a total of about 23.4 acre-feet for the six wells. Water needed for drilling and completion activities would be obtained from existing water permits for the White River below Boise Creek and either trucked or piped to the drilling sites. Water used for drilling and completion activities would be cleaned, tested and reused for drilling and completion activities at the next proposed well. Therefore, the final amount of water used for these actions could be less than 3.9 acre-feet per well, as estimated above. Additional water would be used for hydrostatic testing of pipelines and dust-abatement activities. Water needed for these actions would also be obtained from existing water permits for the White River below Boise Creek. The Proposed Action would consume about 0.004 percent of the average annual flow in the White River (refer to the Water Quality, Surface and Ground, section in this EA). This estimated total quantity would be considered a non-historic depletion to the Upper Colorado River Basin.

Based on the estimated non-historic water depletion from the Upper Colorado River Basin, the Proposed Action "*may affect, and is likely to adversely affect*" the Colorado River fish and USFWS-designated critical habitats for the Colorado River fish downstream of the Project Area in the White and Green Rivers. Because the affects of this project on Colorado River fish and their critical habitats are considered integral with collective depletion impacts presently being evaluated within BLM's Programmatic Consultation with the USFWS, the proposed action requires no further consultation.

Environmental Consequences of the No Action Alternative: Under the No Action Alternative, the proposed wells and supporting infrastructure would not be approved. Thus, under the No Action Alternative, impacts from ongoing energy development activities in the

Yellow Creek Field as they relate to threatened, endangered or sensitive animal species would remain unchanged from current levels and trends.

Mitigation: Prior to surface-disturbing activities, BOPCO and/or their contractors would determine if active/occupied raptor nests are present within ¼ mile of proposed development sites. In the event raptor nesting activity is found in close proximity to proposed developments or project-related activity (i.e., undetected in earlier surveys or found in subsequent years), surface features may be subject to relocations of up to 200 meters and development activity deferred during the period from nest establishment until young have successfully fledged and dispersed from the nest stand.

To minimize the potential for vehicle collisions with raptors, BOPCO would advise project personnel regarding appropriate speed limits in the Project Area, and CDOW would be contacted regarding the presence of carrion within or along roadways.

Finding on the Public Land Health Standard for Threatened and Endangered Species: Implementation of the Proposed Action or No Action Alternative would not prevent lands in the Project Area from meeting the public land health standards for special status terrestrial species. The Proposed Action is considered an incremental addition to those lands dedicated to mineral development, but would not detract measurably from continued meeting of the public land health standard.

For special status aquatic species, the Proposed Action would adversely affect the Colorado River fish and their USFWS-designated critical habitat. As such, the Proposed Action would detract incrementally from, but would not compromise continued meeting of the public land health standard. The No Action Alternative would not detract from continued meeting of the public land health standard.

THREATENED, ENDANGERED, AND SENSITIVE PLANT SPECIES (includes a finding on Standard 4)

Affected Environment: Three Federally threatened plant species have the potential to occur in or around the Project Area: Dudley Bluffs bladderpod (*Lesquerella congesta*), Dudley Bluffs twinpod (*Physaria obcordata*) and Ute Ladies'-tresses (*Spiranthes diluvialus*). Appendix F provides a summary of potential occurrences for other special status plant species.

The Dudley Bluffs bladderpod is a member of the mustard family and is endemic to the Piceance Basin in Rio Blanco County, Colorado. It is found on white shale outcrops of the Green River and Uinta Formations at elevations ranging from 6,100 to 6,700 feet (USFWS 1993).

The Dudley Bluffs twinpod is also a member of the mustard family and is endemic to the Piceance Basin in Rio Blanco County, Colorado. It is found on steep, barren, white shale outcrops of the Green River and Uinta Formations at elevations ranging from 5,900 to 7,500 feet (USFWS 1993).

The Ute Ladies'-tresses is a member of the orchid family and is found throughout the Rocky Mountain States. The Ute Ladies'-tresses is found in sub-irrigated alluvial soils among riparian vegetation in wet meadows, and along streams, springs or lake shores. It is limited to elevations between 4,500 and 6,800 feet (Spackman et. al. 1997).

Potential habitat for these three species occurs throughout the Project Area. Several ground surveys were conducted in 2007 to determine the presence/absence of suitable habitat and populations of the plant species. Approximately 560 acres, including the proposed six well locations, associated pipeline and road ROWs (as well as a 100 meter buffer around each of these components) proposed under this EA were surveyed (B&A 2007e).

No suitable habitat for the Ute Ladies'-tresses was identified in the surveyed areas. Approximately 7 acres of suitable habitat for the Dudley Bluffs bladderpod and Dudley Bluffs twinpod were identified in the surveyed areas. Identified suitable habitat was associated with proposed well YCF 12-32-1 and/or its associated pipeline or road ROW. No populations of Dudley Bluffs bladderpod or Dudley Bluffs twinpod were identified in the surveyed areas (B&A 2007e).

As currently staked, no populations of special status species occur within 100 meters of the proposed well pads and associated pipelines and roads that were surveyed.

Environmental Consequences of Proposed Action: Under the Proposed Action, a total of approximately 31 acres of initial surface disturbance would occur in the Project Area. Based on the results of ground surveys for all areas proposed for disturbance, the Proposed Action would not have direct impacts on individual special status plants or suitable special status plants' habitat.

Indirect impacts on special status plant species and their suitable habitat could include increase in invasive species, and increase in fugitive dust. Increased roadway infrastructure and vehicle traffic in the Project Area could lead to loss or modification of plant habitat due to the spread of invasive weed species, and an increase in fugitive dust. Weed species may compete with individual special status plants, potentially resulting in loss of individuals and degradation of special status plant habitat. Fugitive dust from areas cleared of vegetation, such as roadways, may affect photosynthesis, respiration, transpiration and allow the penetration of phytotoxic gaseous pollutants (Farmer 1993).

Specific actions set out under the Proposed Action, including revegetation of disturbed areas, control and prevention of noxious weeds, and dust abatement, would reduce impacts to special status species and their habitat in the Project Area. Successful interim reclamation would reduce by 15 acres the estimated total initial surface disturbance of 31 acres. As such, long-term surface disturbance in the Project Area would be approximately 16 acres for the LOP.

Based on no direct disturbance to plants or their suitable habitat and adherence to the above-mentioned actions, the Proposed Action would have "***no effect***" on the Dudley Bluffs bladderpod, Dudley Bluffs twinpod, and Ute Ladies'-tresses.

Environmental Consequences of the No Action Alternative: Under the No Action Alternative, the proposed wells and supporting infrastructure would not be approved. Thus, under the No Action Alternative, impacts from ongoing energy development activities in the Yellow Creek Field as they relate to threatened, endangered or sensitive plant species would remain unchanged from current levels and trends.

Mitigation: No additional mitigation measures for threatened, endangered, and sensitive plant species are recommended.

Finding on the Public Land Health Standard for Threatened and Endangered Species: Most of the plant communities within the Project Area have an appropriate age structure and diversity of species that meet the criteria established in the standard for vegetation. With successful reclamation, implementation of the Proposed Action would not change this status.

Of the approximate 560 acres surveyed, about 7 acres (or 1 percent) of suitable habitat for the Dudley Bluffs twinpod and Dudley Bluffs bladderpod was documented within the Project Area. It can be assumed that a proportional amount of suitable habitat occurs in the 13,004-acre Project Area, and is available for the Dudley Bluffs twinpod's and bladderpod's recovery. In addition, a survey conducted in the Project Area, but unrelated, and outside of areas proposed for development under the Proposed Action, identified a population of Dudley Bluffs bladderpod (B&A 2007e). This population had been previously documented by the BLM in 2006, which suggests that there are stable populations of the Dudley Bluffs twinpod in the Project Area. This meets the criteria established in the standard for special status species.

WASTES, HAZARDOUS OR SOLID

Affected Environment: The management of hazardous and non-hazardous (solid) wastes is regulated under the Resource Conservation and Recovery Act (RCRA) while the management of releases of hazardous materials into the environment is regulated under the Comprehensive Environmental Response, Compensation and Liabilities Act (CERCLA). Oil and gas exploration and production wastes, and releases of hazardous materials into the environment, are regulated by the Colorado Oil and Gas Conservation Commission (COGCC) or the Colorado Department of Public Health and Environment (CDPHE) as well as the BLM.

BOPCO has in place an Emergency Action Response Plan to respond to releases of hazardous materials such as condensate or produced water. Releases of material are reported to Federal and State regulators as required, including the BLM. Remediation of contaminated soils or off-site disposal of contaminated materials is approved by BLM prior to BOPCO taking any action.

A search of the Colorado Hazardous Materials and Waste Management Division and the Environmental Protection Agency's (EPA) RCRA databases indicate there are no known hazardous waste disposal sites within the Project Area, nor are there any known permitted solid waste disposal sites.

Environmental Consequences of Proposed Action: The Proposed Action includes the construction and operation of six wells, production tank facilities, gas and water pipelines. Each of these elements would require the use of hazardous materials such as drilling mud components, pipe, cement, corrosion inhibitors, new and used lube oils, paints, gasoline, and diesel fuel. These materials would be limited to the proposed wells and associated infrastructure locations. Chemicals subject to reporting under SARA Title III (hazardous materials including diesel fuel, produced hydrocarbons, drilling fluids, etc.) would be present during various phases of the project including drilling, testing, completion, and production. Annual Tier II chemical inventory reports would be prepared and submitted to emergency response agencies per Federal and State requirements. Scrap metal and other recyclable refuse would be periodically hauled off site. It is not expected that any extremely hazardous substances, as defined in the Act, would be used in these operations.

Environmental Consequences of the No Action Alternative: Under the No Action Alternative, the proposed wells and supporting infrastructure would not be approved. Thus under the No Action Alternative, impacts from hazardous or solid wastes from ongoing energy related activities would not occur due to continued strict adherence to Federal and State regulations relative to hazardous and solid waste materials.

Mitigation: To further minimize impacts of hazardous and solid waste from spills and/or leaks, the following actions should be incorporated as Conditions of Approval to the final authorizations:

The release of any chemical, oil, petroleum product, produced water, or sewage, etc, (regardless of quantity) must be reported by the lease holder, to the Bureau of Land Management – WRFO Hazardous Materials Coordinator at (970) 878-3800.

The operator will submit via sundry order the method of handling produced water from completed wells, as per Onshore Order no.7.

Water-based drilling mud and completion fluids would be recycled to minimize the need for proper disposal. Produced water during drilling and completion activities would be cleaned and tested for reuse to minimize the volume that needs to be disposed. Disposal of all water would be in strict conformance with established rules and regulations relating to the Clean Water Act and existing Federal and state water quality requirements.

Construction debris and general wastes would be managed as solid waste and disposed of at approved disposal facilities permitted by the State of Colorado. Receptacles would be provided for the collection of wastes generated during construction and operations.

SWMPs have been prepared for individual proposed wells as required by 40 CFR 112 (refer to Appendix D).

All pipelines would be hydrostatically tested to ensure integrity in accordance with current industry standards (American Society of Mechanical Engineers [ASME] B31.4 and B31.8) and

with current Federal regulations. All hydrostatic test water would be tested to meet current water quality standards before being properly disposed at an approved facility.

WATER QUALITY, SURFACE AND GROUND (includes a finding on Standard 5)

Affected Environment: Surface Water: The Project Area is located within the Yellow Creek watershed. The Yellow Creek watershed covers approximately 262 square miles and is part of the White River watershed. Yellow Creek flows to the northeast from its headwaters on the Cathedral Bluffs to its confluence with the White River approximately 25 miles west of Meeker. The drainage area is characterized by steep-sided, rugged terrain with intersecting gulches incised into plateau areas.

A map of surface water features within and near the Project Area is provided in Appendix A, Figure 2. The Project Area is drained by a series of ephemeral tributaries to Yellow Creek and Duck Creek. Yellow Creek contains perennial flow, while all other streams within the Project Area (including Pinto Gulch in the northern portion of the Project Area) are ephemeral with flow occurring only after summer thunderstorms and during spring snowmelt. Duck Creek joins Yellow Creek just south of the Project Area boundary. Pinto Gulch flows to the northwest and joins Yellow Creek north of the Project Area. The creek bottoms within these drainages are typically vegetated with sagebrush, greasewood and grasses. Perennial stream channels in Yellow Creek are typically incised into the sediments that cover the floor of the valley about 10-20 feet and generally support little riparian vegetation.

A series of ponds and marshes, known as the Violet Ponds, are present near Yellow Creek in Section 36, T1N, R98W, as shown on Appendix A, Figure 2. These ponds have been designated as a State Wildlife Preserve.

Streamflow data have been recorded since 1972 at U.S. Geological Survey (USGS) gauging station 09306255 on Yellow Creek near the confluence with the White River. This station is located approximately 12 miles downstream of the Project Area. In addition, streamflow data were collected from three other gauging stations near the Project Area during the period October 1975 to September 1977. The locations of the gauging stations are shown on Appendix A, Figure 2. Despite the short period of record for these three stations, the data are still useful for evaluating flow conditions on Duck Creek and ephemeral tributaries to Yellow Creek. Based on the flow data from station 09306255 on Yellow Creek, water years 1976 and 1977 were low flow years, with the flow at this station being about 50 percent and 44 percent, respectively, of the long-term average.

Table 9 below provides summary flow data for the four stations. Mean monthly discharge from Yellow Creek ranges from 2.5 to 3.4 cubic feet per second (cfs) and is relatively constant throughout the year. Based on the average flow in the White River below Boise Creek (USGS station 09306290), Yellow Creek provides about 3.7 percent of the flow in the White River. Flow was only present at the other three stations for a total of 11 to 16 days out of 731 days of measurements. These data confirm that flow in the ephemeral drainages in the Project Area, including Duck Creek, is only present after precipitation events.

Table 9: Streamflow Data for USGS Gaging Stations

USGS Gauging Station	Range of Monthly Mean Discharge (cfs)	Peak Daily Discharge (cfs)	Mean Annual Discharge (cfs)	Period of Record
Yellow Creek near White River, CO 09306255	2.5 (January) to 3.4 (May)	90 (Aug 21, 1973)	2.94	October 1972 – February 2007
Yellow Creek Tributary near 84 Ranch, CO 09306246	0.0 (most months) to 0.28 (February)	3.2 (Feb 27, 1976)	0.03	October 1975 – September 1977
Duck Creek at Upper Station near 84 Ranch, CO 09306248	0.0 (most months) to 0.04 (March and July)	1.5 (Mar 18, 1976 and July 24, 1977)	0.009	October 1975 – September 1977
Duck Creek near 84 Ranch, CO 09306250	0.0 (most months) to 0.14 (February)	3.9 (Feb 28, 1976)	0.017	October 1975 – September 1977

Data source: USGS. 2008

Groundwater: Groundwater occurs in both bedrock and alluvial aquifers beneath the Piceance Basin. The principal water-bearing bedrock units within the basin include the Uinta Formation and parts of the Green River Formation. The lower portions of the Green River Formation and the underlying Wasatch Formation consist of low-permeability clays, shales, and sandstones.

The groundwater system within the basin in the vicinity of the Project Area is typically divided into three aquifer zones: 1) alluvial aquifers, 2) upper aquifers, and 3) lower aquifers (Weeks and Welder 1974). The aquifer systems extend over 700 square miles (Robson and Saulnier 1981) and contain an estimated groundwater reserve of 25 million acre-feet. Groundwater gradients within the basin range from about 20 to as much as 120 feet per mile (Robson and Saulnier 1981). The alluvial aquifers comprised of unconsolidated sand, gravel, silt, and clay, occur as discontinuous units along valley bottoms. The saturated thickness of this aquifer is variable, ranging from a few feet to up to 100 feet (Weeks and Welder 1974). Weeks and Welder (1974) reported that high pumping rates can initially be obtained from alluvial aquifer wells at some locations within the basin, but the high rates can only be sustained for short periods because of the limited extent of the aquifer and recharge rates.

The most current data available from the solute mining activities and research and development for oil shale has indicated that within the upper aquifers there is generally a more productive zone called the A Groove that could be used for water resources. In the lower aquifers there is an area called the B Groove that may also produce water, although more saline. The confining layer that is observed between the lower and upper aquifers is actually near the Mahogany and called the R5. However, in general the descriptions given in Weeks and Welder (1974) and others work for general understanding of the groundwater resources. Local variations and regional as well as vertical heterogeneity in the upper and lower aquifer zones should be assumed. Also, due to preferential flow paths created by faults, fractures, joints and linked solute cavities, permeability and transmissivity may also vary greatly depending on these local conditions. These features generally drive groundwater interactions between aquifers.

The upper aquifers consist of fractured, lean oil shale of the Parachute Creek Member of the Green River Formation above the Mahogany Zone, and sandstone, siltstone, and fractured marlstone of the saturated portion of the overlying Uinta Formation. The primary porosity of materials within the upper aquifers is generally low, but the permeability is enhanced by secondary features such as fractures, faults, joints, and solution cavities (Weeks and Welder 1974). Groundwater in the upper aquifers usually exists under confined conditions except near outcrop areas. Hydraulic conductivity of the upper aquifers ranges from about 0.2 to 0.6 feet per day (Glover et al 1998), but can vary greatly depending on preferential flow paths associated with faults, fractures, and joints.

The lower aquifers consist of fractured oil shale and marlstone of the Parachute Creek Member of the Green River Formation. The hydraulic conductivity of the Lower Aquifer ranges from about 0.1 to 0.6 feet per day (Glover et al 1998), in general. The Mahogany Zone and/or the R5 layer acts as a confining unit in some locations between the upper and lower aquifers. The lower aquifers can be characterized as a "leached zone" because secondary porosity and permeability have been enhanced by the dissolution of minerals, mainly nahcolite, by percolating groundwater. Groundwater within the lower aquifers generally exists under confined conditions.

Perched groundwater zones also occur locally within the Uinta Formation and are not considered to be part of the Upper Aquifer. These perched zones can occur in the ridges between surface water drainages and may be manifested as springs and seeps above the valley floor in outcrop areas (Weeks and Welder 1974; Cole et al. 1995).

Recharge areas for both the upper and lower aquifers are present on the top of the Douglas Plateau and Roan Cliffs, to the south of the Project Area. The estimated total recharge to the Piceance Basin aquifer systems north of the Colorado River is about 30,400 acre-feet per year (Glover et al 1998).

Environmental Consequences of Proposed Action: Surface Water: Potential impacts that would occur to the surface water system include increased surface water runoff and off-site sedimentation due to soil disturbance associated with construction activities, water quality impairment of surface waters, and stream channel morphology changes due to road and pipeline crossings. Potential impacts of erosion to surface water from the Proposed Action include increased turbidity and sedimentation in watercourses, increased runoff, and depletion of surface water flows in the White River. The magnitude of the impacts to surface water resources would depend on the proximity of the disturbance to drainage channels, slope aspect and gradient, degree and area of soil disturbance, soil character, and duration of time within which construction activities occur, and the timely implementation and success/failure of mitigation measures.

Impacts would likely be greatest shortly after the start of construction activities and would likely decrease in time due to stabilization, reclamation, and revegetation efforts. Changes in surface hydrology from road construction would continue through the life of the project and may extend beyond the project life if roads are left in place. Surface disturbance would increase wind and water erosion and change soil properties leading to increased runoff and rain splash erosion.

Sediment transportation in ephemeral systems requires storm events and typically occurs in stages with intense and localized storms. For example, increased surface runoff or concentrated flows in rills and gullies in upland hillsides may transport material to channels if it is stored for months or years. Storm events that result in flows in ephemeral channels may then move sediment stored in channel bottoms and include additional material eroded from the channels themselves. Outcomes from the dynamics of these sediment transport processes may be difficult to predict, however as activities, intercept shallow groundwater, disturb vegetation, increase surface runoff, concentrate surface flows, and otherwise modify surface hydrology, annual sediment yields are likely to increase in these ephemeral systems.

The six proposed wells are located near a series of intermittent tributaries to Yellow Creek, as shown on Appendix A, Figure 2. Table 10 below provides a list of the estimated amount of cut material, production facilities capacities, the distance to the nearest ephemeral drainage channel, and the distance to the nearest perennial stream for each proposed well. The nearest primary ephemeral drainage is defined as that shown as a dashed blue line on Figure 2. Three well pads (YCF 11-41-1, 28-23-1, and 32-12-1) would be located less than 1,000 feet from the nearest primary ephemeral drainage. Runoff and potentially increased sediment delivery from well pads YCF 28-23-1, 28-44-1 and 32-12-1, would flow to the north and northwest into Pinto Gulch. Runoff and potentially increased sediment delivery from well pads 11-41-1, and 12-32-1 would flow into a series of ephemeral tributaries to the west of Yellow Creek and then into Yellow Creek. Runoff and potentially increased sediment delivery from the YCF 4-44-1 well pad would flow to the south to Duck Creek.

Table 10: Summary of Well Pad Facilities and Distance to Surface Water

Well No.	Estimated Amount of Cut Material (Cubic Yards)	Production Facilities at Location	Distance to Nearest Ephemeral Drainage (feet)	Distance to Nearest Perennial Stream - Yellow Creek (miles)
YCF 4-44-1	13,890	3 x 300 bbl tanks	1,125	1.7
YCF 11-41-1	20,830	2 x 300 bbl tanks	875	0.5
YCF 12-32-1	14,670	3 x 300 bbl tanks	1,125	1.2
YCF 28-23-1	26,490	2 x 300 bbl tanks	300	3.1
YCF 28-44-1	18,360	2 x 300 bbl tanks	1,250	2.6
YCF 32-12-1	24,790	2 x 300 bbl tanks	625	4.2

Source: Individual Surface Use Plans for each of the proposed wells, as submitted to the BLM.

The amount of additional sediment that would reach the ephemeral drainages in the Project Area depends on natural factors and the effectiveness of the BMPs employed. Natural factors which attenuate the transport of sediment into creeks include water available for overland flow; the texture of the eroded material; the amount and kind of ground cover; the slope shape, gradient, and length; and surface roughness (Barfield et al 1981). Pipeline and road crossings of ephemeral drainages would account for much of the increased sediment delivery in the Project Area.

Soil compacted on roadways and well pads contribute greater runoff than undisturbed sites. The increased runoff could lead to slightly higher peak flows in Yellow Creek, potentially increasing erosion of the channel banks. The increased erosion could lead to slightly increased turbidity in Yellow Creek during storm events. The magnitude of this impact cannot be quantified, but is likely negligible based on the small amount of proposed surface disturbance compared to the size of the watershed.

Increased short-term localized sediment production would occur during the construction and operation of well pads, access roads, and pipelines for the Proposed Action due to increased erosion during snowmelt and precipitation events. Sediment transported to the Violet Ponds and perennial stretches of Yellow Creek would degrade aquatic habitat in these systems by covering stream substrates with fine sediments; and increase the sediment loading and turbidity within Yellow Creek.

Water would be used during construction activities for drilling, dust control, and hydrostatic testing of the pipelines. The Proposed Action would use approximately 3.9 acre-feet for drilling and completion of each well, or about 23.4 acre-feet for the six wells. The average annual discharge of the White River below Boise Creek is about 789 cfs (571,362 acre-feet). Therefore, assuming that six wells are completed in one year, drilling and completion activities would consume about 0.004 percent of the average annual flow in the White River. Additional water would be used for dust control and hydrostatic testing of the pipelines. Low flows in the White River generally occur in June and July and may result in less than 100 cfs average during some days. The lowest flow on record was July 17, 2002, and the flow was 53 cfs.

Groundwater**:** Known water bearing zones in the Project Area are above the Wasatch Formation, specifically the areas known as the A and B Grooves which are above and below the Mahogany. Surface casing is generally taken 750 feet below the top of the Wasatch Formation to protect groundwater. Table 11 below provides the depth of surface casing for each proposed well.

Table 11: Estimated Depth of Surface Casing for the Proposed Wells

Well No.	Estimated Depth of the Top of the Wasatch Formation	Depth of Surface Casing (Feet)
YCF 4-44-1	2,736	3,486
YCF 11-41-1	3,101	3,851
YCF 12-32-1	2,986	3,686
YCF 28-23-1	2,825	3,575
YCF 28-44-1	2,795	3,545
YCF 32-12-1	2,664	3,414

Source: Individual Surface Use Plans for each of the proposed wells, as submitted to the BLM.

This project is unlikely to contribute to the mixing of the lower aquifers and upper or alluvium aquifers due to the proposed depth of surface casing for the proposed wells. As Table 11 shows, surface casing will extend 750 feet below the top of the Wasatch. If this surface casing fails or cementing is poor, there is a minor potential for commingling of drilling water with waters from the upper and lower aquifers. If failure of drilling practices and or problems with cementing for well bores this were to occur, localized contamination of shallow aquifers such as the A Groove or possibly Yellow Creek's alluvial aquifer could receive saline waters from deeper formations.

It is likely Yellow Creek receives some flow from deeper confined aquifers already through natural pathways as evident from surface deposits of precipitated salt found near the mouth of Yellow Creek. During higher flows these salts can be flushed into the surface system. With proper drilling and completion practices mixing of lower aquifers with the upper or alluvial aquifer of Yellow Creek is unlikely.

Environmental Consequences of the No Action Alternative: Under the No Action Alternative, the proposed wells and supporting infrastructure would not be approved. Thus under the No Action Alternative, impacts to surface and ground water quality resulting from ongoing energy development activities in the Yellow Creek Field would remain unchanged from current levels and trends.

Mitigation: To further minimize impacts to surface and ground water resources and water quality, the following actions should be attached as Conditions of Approval to the final authorizations:

Provide for erosion-resistant surface drainage by adding necessary drainage facilities and armoring prior to fall rain or snow. When erosion is anticipated, sediment barriers shall be constructed to slow runoff, allow deposition of sediment, and prevent it from leaving the site. In addition, straining or filtration mechanisms may also contribute to sediment removal from runoff (see Appendix D).

Locate culverts or drainage dips in such a manner as to avoid discharge onto unstable terrain such as headwalls or slumps. Do not use culverts smaller than 18 inches in diameter. Provide adequate spacing to avoid accumulation of water in ditches or road surfaces. Monitor culvert installations to ensure adequate armoring of inlet and outlet and no erosion of design. Patrol areas susceptible to road or watershed damage during periods of high runoff.

The operator will submit a design for the rock check dams to be used as part of the stormwater measures. The design should include the type of rock, fabric or other materials to be used, shape and height of the dams and maintenance planned.

The catchbasin on YCF 4-44-1 will maintain a 2-foot freeboard and should be monitored after storm events.

Keep road inlet and outlet ditches, catch basins, and culverts free of obstructions, particularly before and during spring runoff. Routine machine-cleaning of ditches should be kept to a minimum during wet weather. Leave the disturbed area in a condition that provides drainage with no additional maintenance.

A Reclamation Status Report will be submitted to the WRFO biannually for all actions that require disturbance of surface soils on BLM-administered lands as a result of the Proposed Action. Actions may include, but are not limited to, well pad and road construction, construction of ancillary facilities, or power line and pipeline construction. The Reclamation Status Report will be submitted by May 15 and November 15 of each calendar year, and will include the well number, legal description, project description (e.g., well pad or pipeline), reclamation status (e.g., interim or final), whether the well pad or pipeline has been re-vegetated and/or re-contoured, date seeded, photos of the reclaimed site, estimate of acres seeded and seeding method (e.g., disk-plowed, drilled, or both). Internal and external review of this plan and the

process used to acquire the necessary information will be conducted annually, and new information or changes in the reporting process will be incorporated into the plan. The Reclamation Status Report will be submitted electronically via email as a Microsoft Excel table to Natural Resource Specialist, Brett Smithers (brett_smithers@blm.gov).

***Finding on the Public Land Health Standard for Water Quality*:** It is unlikely that the access road and well pad construction, as well as drilling and production activities would result in an exceedence of state water quality standards.

WETLANDS AND RIPARIAN ZONES (includes a finding on Standard 2)

Affected Environment: BLM has identified Yellow Creek, which bisects the Project Area into an eastern and a western portion, as "a high priority riparian habitat" (BLM 1997). Approximately 0.7 miles of Yellow Creek Reach Five occurs within the Project Area and is considered perennial. This reach of Yellow Creek was last assessed in 1995 and is in a non-functional condition (due to its ephemeral nature), meaning that it is "not providing adequate vegetation or landform to help dissipate stream energy associated with high stream flows" (BLM 1997).

Duck Creek is located to the south, but outside of the Project Area and flows into Yellow Creek. Reach One of Duck Creek was last assessed in 1997, and is functioning at risk, meaning that it is in "functioning condition but an existing soil, water or vegetation attribute makes them susceptible to degradation" (BLM 1997).

Environmental Consequences of Proposed Action: As proposed, no surface-disturbing activities under the Proposed Action would occur in designated wetland and riparian zones.

Indirect impacts to wetlands and riparian zones could result from increased sediment loading to these areas, a potential increase in noxious weeds, and a potential for spills and leaks from construction equipment. Specific actions set out under the Proposed Action would reduce impacts to wetlands and riparian zones. These actions include: avoidance of wetlands and riparian habitats, revegetation of disturbed areas, control and prevention of noxious weeds, proper application of chemical treatments in the vicinity of this resource, and actions to reduce surface runoff and soil sediments. Successful interim reclamation would reduce by 15 acres the estimated total initial surface disturbance of 31 acres. As such, long-term surface disturbance in the Project Area would be approximately 16 acres for the LOP. In addition, noxious weed infestations on disturbed surfaces would be controlled, therefore reducing indirect impacts to wetlands and riparian zones.

Environmental Consequences of the No Action Alternative: Under the No Action Alternative no construction would take place. Impacts to wetlands and riparian zones would continue at current levels. Under the No Action Alternative, the proposed wells and supporting infrastructure would not be approved. Thus under the No Action Alternative, impacts to wetlands and riparian zones associated with Yellow Creek or Duck Creek resulting from ongoing

energy development activities in the Yellow Creek Field would remain unchanged from current levels and trends.

Mitigation: No additional mitigation measures for wetlands and riparian zones, beyond those described above, are recommended.

***Finding on the Public Land Health Standard for Riparian Systems*:** Although Reach Five of Yellow Creek is non-functional, this is mainly related to its ephemeral nature. As project-related activities would not disturb any wetlands or riparian zones, and measures would be taken to prevent indirect impacts, neither the Proposed Action nor No Action Alternative would have any effective influence on the function or condition of Yellow Creek, its riparian condition, or its land health status.

CRITICAL ELEMENTS NOT PRESENT OR NOT AFFECTED

No prime and unique farmlands, floodplains, or Wild and Scenic Rivers exist within the area affected by the Proposed Action. There are also no Native American religious or environmental justice concerns associated with the Proposed Action.

There are no designated wilderness areas, Wilderness Study Areas (WSAs), or lands with wilderness characteristics in the Project Area. Therefore, wilderness has been dismissed from further analysis.

NON-CRITICAL ELEMENTS:

The following elements must be addressed due to the involvement of Standards for Public Land Health:

SOILS (includes a finding on Standard 1)

Affected Environment: Soils in the Piceance Creek Basin occupy varying landforms including narrow valleys, rolling hills, and steep-sided ridges. The semi-arid environment has retarded soil development. Lack of moisture and relatively cool temperatures have suppressed vegetation growth and slowed the chemical and biological processes needed for good soil development (BLM 1994).

Soils in some areas of the Piceance Creek Basin are high in sodium and other salts. These soils generally support a sparse vegetation cover of salt-tolerant shrubs, grasses, and lichens. Runoff from these soils transports salt in solution and sediments containing salts that go rapidly into solution when they reach a waterway. Soils that are highly susceptible to water erosion are also present within the Project Area. The surface of these soils generally has a high proportion of fine materials with little organic matter, which leads to little infiltration and rapid runoff.

Detailed maps of the soils that cover the Project Area were originally contained within the Soil Survey of Rio Blanco County Area, Colorado (USDA-SCS 1982). This information is now also available online on the U.S. Department of Agriculture, National Resource Conservation Service (USDA-NRCS) Web Soil Survey.

A map of the soil types that occur in the Project Area is provided in Appendix A, Figure 3. Descriptions of the pertinent soil types that would be potentially affected by the proposed project are provided below.

Barcus Channery Loamy Sand (Map Unit 6): This deep, excessively drained soil is located on alluvial fans and in narrow valleys at elevations between 5,800 and 6,800 feet on slopes of 2 to 8 percent. The soil is calcareous throughout and consists of a surface layer of pale brown channery loamy sand about 6 inches thick, an underlying layer of light yellowish brown channery loamy sand about 10 inches thick, and stratified light yellowish brown and pale brown very channery sand and loamy sand to a depth of about 60 inches. The soil is characterized by rapid infiltration, slow runoff, and a low available water capacity. The water erosion hazard is moderate.

Forelle Loam (Map Unit 33): This deep, well-drained soil is located on terraces and uplands at elevations between 5,800 and 7,200 feet on slopes of 3 to 8 percent. The soil consists of a surface layer of pale brown loam about 4 inches thick, an underlying layer of yellowish-brown clay loam about 12 inches thick, and very pale brown loam to a depth of about 60 inches. The soil is characterized by moderate infiltration and runoff, and a high available water capacity. The water erosion hazard is moderate.

Glendive Fine Sandy Loam (Map Unit 36): This deep, well-drained soil is located along drainageways on alluvial valley floors at elevations between 5,800 and 7,200 feet on slopes of 2 to 4 percent. The soil is calcareous throughout and consists of a surface layer of pale brown, fine sandy loam about 6 inches thick and very pale brown, stratified fine sandy loam to a depth of about 60 inches. The soil is characterized by moderately rapid infiltration, slow runoff, and a moderate available water capacity. The water erosion hazard is slight and the soil is subject to rare periods of flooding.

Havre Loam (Map Unit 41): This deep, well-drained soil is located on floodplains and alluvial low stream terraces at elevations between 5,800 and 7,200 feet on slopes of 0 to 4 percent. The soil consists of a surface layer of light brownish gray loam about 21 inches thick and stratified light gray loam and silt clay loam to a depth of about 60 inches. The soil is characterized by moderate infiltration, moderate runoff, and a high available water capacity. The water erosion hazard is slight and the soil is subject to brief periods of flooding in the spring and summer.

Piceance Fine Sandy Loam (Map Unit 64): This moderately deep, well-drained soil is located on uplands and broad ridgetops at elevations between 6,300 and 7,500 feet on slopes of 5 to 15 percent. The surface layer is brown fine sandy loam 4 inches thick. The upper 5 inches of subsoil is brown loam followed by 13 inches of light yellowish brown loam. The substratum is very pale brown channery loam about 8 inches thick. Hard sandstone is at a depth of 30 inches. Permeability is moderate and available water capacity is moderately low. Runoff is slow to medium and the water erosion hazard is moderate to high.

Redcreek-Rentsac Complex (Map Unit 70): This map unit is located on mountainsides and ridges at elevations between 6,000 and 7,400 feet on slopes of 5 to 30 percent. The unit is 60 percent Redcreek sandy loam and 30 percent Rentsac channery loam. The Redcreek soil is shallow and well-drained. The surface layer is brown sandy loam 4 inches thick. The next layer is calcareous sandy loam about 7 inches thick. The underlying material is very pale brown, calcareous channery loam about 5 inches thick. Hard sandstone is at a depth of 16 inches. Permeability of the Redcreek soil is moderate and available water capacity is very low. Runoff is medium and the water erosion hazard is moderate to high. The Rentsac soil is shallow and well-drained. The upper part of the surface layer is grayish brown channery loam about 5 inches thick, the next layer is 4 inches of brown very channery loam, and the underlying material is very pale brown, extremely flaggy loam 7 inches thick. Hard sandstone is at a depth of about 16 inches. Permeability of the Rentsac soil is moderate and available water capacity is very low. Runoff is medium and the water erosion hazard is moderate to high.

Rentsac Channery Loam (Map Unit 73): This shallow, well-drained soil is located on ridges, foothills, and sideslopes at elevations between 6,000 and 7,600 feet on slopes of 5 to 50 percent. The upper part of the surface layer is grayish brown channery loam about 5 inches thick, the next layer is 4 inches of brown very channery loam, and the underlying material is very pale brown, extremely flaggy loam 7 inches thick. Hard sandstone is at a depth of about 16 inches. Permeability of the Rentsac soil is moderate and available water capacity is very low. Runoff is rapid and the water erosion hazard is moderate to very high.

Torriorthents-Rock Outcrop Complex (Map Unit 91): This map unit is located on extremely rough and eroded areas on mountains, hills, ridges, and canyonsides at elevations between 5,100 and 7,500 feet. The unit is 50 percent Torriorthents on slopes of 15 to 65 percent and 30 percent rock outcrop on slopes of 35 to 90 percent. Torriorthents are very shallow to moderately deep and well-drained to somewhat excessively drained. Torriorthents are calcareous throughout and highly variable with no single profile being typical. In some areas the surface layer is stony or flaggy. Permeability is moderate and available water capacity is very low. Runoff is very rapid and the water erosion hazard is very high. Rock outcrop consists of barren escarpments, ridge caps, and points of sandstone, shale, limestone, or siltstone.

Yamac Loam (Map Unit 104): This deep well-drained soil is located on rolling uplands, terraces, and fans at elevations between 5,800 and 7,100 feet on slopes of 2 to 15 percent. The surface layer is brown loam about 4 inches thick. The upper 8 inches of the subsoil is brown loam and the lower 10 inches is highly calcareous loam. The upper 26 inches of the substratum is very pale brown loam and the lower part to a depth of 60 inches or more is pale brown loam. Permeability is moderate and available water capacity is moderate to high. Runoff is medium and the water erosion hazard is slight to moderate.

Environmental Consequences of Proposed Action: Potential impacts to soils in the Project Area from the Proposed Action include removal of vegetation, mixing of soil horizons, soil compaction, increased susceptibility of the soils to erosion, contamination of soils with petroleum products, and loss of topsoil productivity.

Table 12 below provides an estimate of the amount of cut and topsoil materials associated with the Proposed Action. As part of the Proposed Action, topsoil would be conserved for interim and final reclamation of the well pads. An estimated total of 12,910 cubic yards of topsoil would be available for reclamation activities.

Table 12: Estimated Amounts of Cut and Topsoil Materials for BOPCO's Proposed Wells

Well No.	Estimated Amount of Cut Material (Cubic Yards)	Estimated Amount of Topsoil Materials (Cubic Yards)
YCF 4-44-1	13,890	2,190
YCF 11-41-1	20,830	2,190
YCF 12-32-1	14,670	2,170
YCF 28-23-1	26,490	2,190
YCF 28-44-1	18,360	1,980
YCF 32-12-1	24,790	2,190
Estimated Total	**119,030**	**12,910**

Source: Individual Surface Use Plans for each of the proposed wells, as submitted to the BLM.

An estimated total of approximately 31 acres of soils would initially be disturbed during the construction of eight well pads and associated co-located access roads and pipelines. All of the new surface disturbance would be on Federal lands. If interim reclamation efforts are successful, the total acreage disturbed in the long-term would be about 21 acres.

The primary effect of surface disturbances on soil resources is increased erosion. Excavation of well pads and construction of the co-located access roads and pipelines could potentially result in localized erosion during construction and drilling activities.

Erosion potential for the soil types in the Project Area ranges from slight to very high. Table 13 below provides a breakdown of the soil types, the erosion potential, and the acreages of new surface disturbance for each soil type on which disturbance would occur. The majority of the new surface disturbance (35 acres) would occur on the Rentsac channery loam, which is rated as moderate to very high for erosion potential, depending on slope.

Table 13: Soil Units, Erosion Potential, and Initial and Long-Term Disturbances

Soil Map Unit Number	Soil Unit Name	Erosion Potential	Initial Disturbance (acres)	Long-Term Disturbance (acres)
36	Glendive fine sandy loam	Slight	1.37	0.79
64	Piceance fine sandy loam	Moderate to High	1.70	0.93
73	Rentsac channery loam	Moderate to Very High	27.48	14.15
91	Torriorthents-rock outcrop complex	Very High	<1	0.00
104	Yamac loam	Slight to Moderate	0.32	0.30
		Estimated Total Disturbance	**30.87**	**16.17**

Contamination of surface and subsurface soils can occur in oil and gas fields. Sources of potential contamination include leaks or spills of produced water, oil, and natural gas condensate

liquids from wellheads, conveyance pipelines, produced water sumps, and condensate storage tanks. Leaks or spills of drilling chemicals, fuels, and lubricants could also result in soil contamination. Of these materials, leaks or spills of natural gas condensate would have the greatest potential environmental impact. Adherence to the SPCC plan would minimize the potential for contamination of surface and subsurface soils from leaks and spills.

Environmental Consequences of the No Action Alternative: Under the No Action Alternative, the proposed wells and supporting infrastructure would not be approved. Thus under the No Action Alternative, impacts to soils resulting from ongoing energy development activities in the Project Area would remain unchanged from current levels and trends.

Mitigation: See the Water Quality Section.

Finding on Public Land Health Standard for Upland Soils: Compaction due to construction activities on roads and at the well pads would reduce aeration, permeability, and water-holding capacity of the soils. Blending of soil types would modify physical characteristics of the soils including structure, texture, and rock content, which could lead to reduced permeability and increased runoff from these areas. With successful reclamation, these actions are unlikely to reduce the long-term productivity of soils impacted by surface-disturbing activities on public lands. However, short-term and localized impacts are expected.

VEGETATION (includes a finding on Standard 3)

Affected Environment: Elevation in the Project Area ranges from approximately 6,030 to 6,870 feet. The USDA-NRCS has surveyed the soils and ecological-site information for Rio Blanco County, including the Yellow Creek Field. Appendix A, Figure 3 displays the soils that occur within the Project Area. Unpublished ecological site descriptions and the USDA-NRCS Web Soil Data (USDA-NRCS 2007), which explain the vegetation typically associated with specific soils, show that four ecological sites occur in the Project Area. These range sites include: foothill swale, stony foothills, rolling loam, and pinyon-juniper woodlands. Table 14 displays the ecological sites, soils typically associated with the sites, and the acreage of the sites within the Project Area. One soil, the Rentsac-Piceance complex, is normally associated with two different ecological sites, pinyon-juniper woodlands and rolling loam, and is displayed and discussed separately.

Table 14: Ecological Sites within the Project Area

Vegetation Community	Soils Associated with Ecological Sites[1]	Estimated Total Acres in Project Area[2]	Percent of Project Area[3]
Pinyon-Juniper Woodland	70 Redcreek-Rentsac complex 73 Rentsac Channery Loam	9,411	72.4
Rolling Loam	33 Forelle Loam 64 Piceance Fine Sandy Loam 104 Yamac Loam	1,529	11.8
Stony Foothills	91 Torriorthents-Rock outcrop complex	1,435	11.0

Vegetation Community	Soils Associated with Ecological Sites[1]	Estimated Total Acres in Project Area[2]	Percent of Project Area[3]
Foothill Swale	6 Barcus Channery Loamy Sand 36 Glendive Fine Sandy Loam 41 Havre Loam	595	4.6
Pinyon-Juniper and Rolling Loam	75 Rentsac-Piceance Complex	34	0.2
Total Acres		13,004	100

[1] Refer to the soils section of this EA for more detailed information on soils within the Project Area.
[2] Total acreage was calculated by adding acreage of associated soils.

Pinyon-Juniper Woodland: As the pinyon and juniper canopy increases above 10 percent, the site becomes pinyon-juniper woodland. These sites occur in higher elevation areas throughout the rest of the Project Area. All proposed wells and their associated roads and pipelines pass through, or are located within, this range site. Some species that are associated with this site include big sagebrush, rabbitbrush, Indian ricegrass, junegrass and wheatgrasses such as bluebunch (*Agropyron spicatum*), beardless (*A. inerme*), and western (A. *smithii*) wheatgrass.

Rolling Loam: Pinyon-juniper woodlands in the Project Area are interspersed with areas of the open rolling loam ecological site. Wells YCF 4-44-1 and 32-12-1, or associated roads and pipelines, pass through, or occur within, this range site. This site is devoid of trees, but includes various shrubs and herbaceous plants. Big sagebrush, rabbitbrush, serviceberry, and gray or spineless horsebrush (*Tetradymia canescens*) occur in this site. Herbaceous species associated with this ecological site include grasses (such as western wheatgrass, needle-and-thread grass, and Nevada [*Poa nevadensis*] and sandberg [*P. sandbergii*] bluegrass) and forbs (such as buckwheat, fleabane, phlox [*Phlox* spp.], lupine [*Lupinus* spp.], globemallow, and American vetch [*Vicia Americana*]).

Pinyon-Juniper and Rolling Loam: An area in the northwestern portion of the Project Area includes a mixture of the pinyon-juniper and rolling loam ecological sites. This area includes a mixture of vegetation found in both ecological sites described above.

Environmental Consequences of Proposed Action: Under the Proposed Action, approximately 31 acres of existing vegetation would be removed in the Project Area. Table 15 below provides a breakdown of disturbance by vegetation community from the Proposed Action.

Table 15: Surface Disturbance by Ecological Site for the Proposed Action

Vegetation Community	Total Acres w/in Project Area	Acres of Initial Surface Disturbance (% of Total)	Acres of Long-Term Surface Disturbance (% of Total)
Pinyon-Juniper Woodland	9,411	28 (0.3 %)	15 (0.2 %)
Rolling Loam	1,529	2 (0.1 %)	<1 (<0.07 %)
Stony Foothills	1,435	<1 (<0.07 %)	0
Foothill Swale	595	0	0
Pinyon-Juniper and Rolling Loam	34	0	0
Total Acres	**13,004**	**31 (0.2%)**	**16 (0.01%)**

Vegetation removal and soil handling associated with the Proposed Action would have both direct and indirect impacts on vegetation resources. Direct impacts would include removal of vegetation and modification of species composition and structure. Indirect impacts may include increased potential for weed invasion, increased exposure of soils to accelerated erosion, increased potential for fugitive dust, and degradation and loss of topsoil and soil microorganisms.

Increased roadway infrastructure and vehicle traffic in the Project Area could lead to loss or modification of plant habitat due to the spread of invasive weed species, and an increase in fugitive dust. Weed species may compete with individual special status plants, potentially resulting in loss of individuals and degradation of special status plant habitat. Fugitive dust from areas cleared of vegetation, such as roadways, may affect photosynthesis, respiration, and transpiration and allow the penetration of phytotoxic gaseous pollutants (Farmer 1993).

Specific actions set out under the Proposed Action, including revegetation of disturbed areas (refer to the Reclamation Plan in Appendix B), control and prevention of noxious weeds, and dust abatement would reduce impacts to vegetation communities in the Project Area.

Environmental Consequences of the No Action Alternative: Under the No Action Alternative, the proposed wells and supporting infrastructure would not be approved. Thus under the No Action Alternative, impacts to vegetation communities in the Yellow Creek Field resulting from ongoing energy development activities would remain unchanged from current levels and trends.

Mitigation: Promptly revegetate all disturbed areas with Native Seed mix #3. Drill seeding is the preferred method of seeding. If seed is broadcast, double the seeding rate and provide for seed coverage by harrowing or dragging after seed application. Table rates are PLS pounds per acre. No debris will be scattered on the pipeline right of way until after seeding operations are complete.

Native Seed mix #3		
Western wheatgrass (Rosanna)	2	Gravelly 10"-14", Pinyon/Juniper
Bluebunch wheatgrass (Whitmar)	1	Woodland, Stony Foothills, 147
Thickspike wheatgrass (Critana)	1	(Mountain Mahogany)
Indian ricegrass (Rimrock)	2	
Fourwing saltbush (Wytana)	1	
Utah sweetvetch	1	
Alternates: Needle and thread, globemallow		

Finding on Public Land Health Standard for Plant and Animal Communities (partial, see also Wildlife, Aquatic, and Wildlife, Terrestrial): Most plant communities within the Project Area have an appropriate age structure and diversity of species which meet the criteria established in the standard for vegetation. With successful reclamation, implementation of the Proposed Action would not change this status.

WILDLIFE, AQUATIC (includes a finding on Standard 3)

Affected Environment: Yellow Creek drains the northern part of the Piceance Basin and discharges into the White River. Water quality within the Yellow Creek watershed is highly variable based on sediment load and organic constituents associated with the following types and sources of water flow: surface water runoff from hillslopes or snowmelt, baseflows by source water from bedrock aquifers, and return flows from agricultural lands (CDOW and USFWS 2007). As such, surface water quality for the portion of Yellow Creek within the Project Area (and reaches downstream of the Project Area) is likely affected by soil erosion and current rangeland management practices within the Project Area. The portion of Yellow Creek that flows through the Project Area is considered perennial, and may support small populations of amphibians (e.g., chorus frog, tiger salamander). This portion of Yellow Creek is not inhabited by fish and there is no information suggesting that it supports northern leopard frog, a State Species of Special Concern and BLM-sensitive species.

Environmental Consequences of Proposed Action: Although implementation of the Proposed Action would not directly affect aquatic habitats in the Project Area, project-related activities under the Proposed Action could indirectly affect aquatic habitats in the Project Area (e.g., those associated with Yellow Creek). Specifically, construction of the six proposed well pads and their associated roads and pipelines would increase erosion and sedimentation, and may change surface water runoff patterns, thereby affecting area drainages tributary to Yellow Creek. Further, increased traffic levels in the Project Area would increase fugitive dust, which subsequently could reduce productivity of riparian vegetation.

Specific actions under the Proposed Action, including implementation and adherence to the Reclamation Plan (refer to Appendix B) and SWMP (refer to Appendix D) could reduce the above-mentioned indirect impacts to aquatic habitats in the Project Area. Erosion control measures, as outlined in the SWMP, would minimize impacts related to increased sediment deposition and changes to surface water runoff patterns.

Environmental Consequences of the No Action Alternative: Under the No Action Alternative, the proposed wells and supporting infrastructure would not be approved. Thus under the No Action Alternative, impacts to aquatic wildlife associated with Yellow Creek resulting from ongoing energy development activities in the Yellow Creek Field would remain unchanged from current levels and trends.

Mitigation: No additional mitigation measures are recommended.

Finding on Public Land Health Standard for Plant and Animal Communities (partial, see also Vegetation and Wildlife, Terrestrial): Neither the Proposed Action nor the No Action Alternative would have any effective influence on the function or condition of Yellow Creek, their aquatic habitat values, or their public land health status.

WILDLIFE, TERRESTRIAL (includes a finding on Standard 3)

Affected Environment: The Project Area supports a diversity of wildlife and wildlife habitats. Species occurrences are typically dependent on habitat availability, carrying capacities, and the degree of existing habitat disturbance. The 13,004-acre Project Area is comprised primarily of low to mid-elevation (6,000-6,800 feet) pinyon-juniper woodlands interspersed with ridgeline and basin parks of Wyoming big sagebrush. Although considerable development has taken place in the Project Area's uplands, overall community and habitat function are considered intact. Naturally occurring water resources are limited to channel, riparian, and wetland habitats associated with the Yellow and Duck Creek valleys, whose terraces and alluvial fans support a xeric shrub community composed of basin big sagebrush, black greasewood, and various forms of rabbitbrush. Herbaceous ground cover on the terraces of the major valleys and their larger contributing drainages tends to be characterized by suboptimal density and excessive complements of invasive and introduced annual grasses and forbs.

Although all wildlife species are important members of wildland ecosystems and communities, most non-game species within the Project Area are common across the WRFO area and have wide distributions within northwest Colorado. There are no narrowly endemic or highly specialized, terrestrial wildlife species known to inhabit those lands potentially affected by the Proposed Action. Consequently, the relationship of most of the typical, non-game species to the proposed project is not discussed in the same depth as those game species (e.g., mule deer [*Odocoileus hemionus*]) that are of high interest or unique value.

Mule deer occur throughout the western mountains, forests, deserts, and shrublands. Typical habitats include short-grass and mixed-grass prairies, sagebrush and other shrublands, coniferous forests, and forested and shrubby riparian areas (UNHP-UDWR 2008). The species is abundant statewide in Colorado, where it occupies "edge" habitats (CDOW 2007). Mule deer often migrate from high mountainous areas in the summer to lower elevations in the winter to avoid deep snow (UNHP-UDWR 2008).

Mule deer that occupy the Project Area are part of the Data Analysis Unit D-7, Game Management Unit 22 (CDOW 2007c). The entire Project Area is classified as mule deer winter range. The eastern and southern portions of the Project Area contain approximately 7,446 acres of severe winter range (Appendix A, Figure 4), which is categorized by the CDOW as critical habitat. These ranges are normally occupied during the late winter and early spring months. Deer gravitate to these lower elevations, late winter ranges because heavy snow accumulations on the higher elevation winter ranges typically limit deer use after January. Deer continue to use these lower elevation ranges through April and into early May because less persistent snow cover promotes accelerated growth and availability of herbaceous forage instrumental in providing nutrition important for rapid winter season recovery and the later stages of gestation .

Environmental Consequences of Proposed Action: Implementation of the Proposed Action would incrementally increase the existing level of functional habitat loss and habitat fragmentation within the Project Area. The estimated surface disturbance of approximately 31 acres of non-game wildlife habitat associated with the construction of well pads, roads, and pipelines would reduce the habitat availability and relative habitat values for a variety of

common wildlife species. Longer term habitat occupation and modification would be expected to have discountable impacts on local non-game wildlife populations, because of its diminutive extent relative to the habitat base available to species that are not tightly restricted to specific habitat types.

Visual and noise disturbances from increased traffic levels and construction, drilling, and completion activities could temporarily displace non-game wildlife from habitats in areas of human activity. Construction, drilling, and completion activities could result in temporary displacement from specific affected habitats during the entire construction period (generally a period of weeks), whereas production activities could result in shorter temporary displacement only during well visits (generally a few hours). If displaced, individual animals could move into less suitable habitats, which could potentially result in deteriorated physical conditions, decreased productivity, and increased general distress.

Overall, the severity of impacts to non-game wildlife species under the Proposed Action would depend on the seasonal and daily timing of traffic and construction, drilling, and completion activities, site-specific topography and vegetation, species' sensitivity to human disturbance, and the availability of suitable habitat within and adjacent to the Project Area. A discussion of direct and indirect impacts to mule deer follows.

Many of the potential impacts to mule deer associated with the Proposed Action would be similar to those described above for non-game wildlife species. Potential impacts to mule deer include:

- Decreased habitat values and reduced habitat use within and/or near disturbed areas due to direct habitat loss and fragmentation of habitat (including subsequent vehicle use of constructed well access);
- Decreased reproductive success and nutritional conditions from increased energy expenditure as a physical response to disturbance;
- Increased stress from intra- and inter-specific competition for resources (e.g., increased forage competition with livestock and wild horses) due to increased animal densities in adjoining or unsuitable habitats;
- Increased potential for collisions with vehicles; and
- Increased harassment and/or poaching.

Surface-disturbing activities associated with the development of specific wells (YCF 11-41-1 and 12-32-1) and their associated roads and pipelines would result in the direct, initial loss of approximately 14 acres of severe winter range for mule deer in the Project Area. As development activities would not be allowed in this habitat from January 1 through April 30, as outlined by the White River RMP/ROD (and modified by the BLM), impacts to mule deer during this sensitive time would not occur. Further, as surface disturbance associated with the Proposed Action would be minimal in relation to the extent of similar habitats across the region, impacts associated with the Proposed Action would not likely alter the mule deer game management unit on a population level basis.

Successful interim reclamation would reduce by 15 acres the estimated total initial surface disturbance of 31 acres. Long-term surface disturbance in severe winter range for mule deer in

the Project Area would be approximately 7 acres for the LOP. Final reclamation would further offset herbaceous forage loss and accelerate the reestablishment of woody forage and cover habitat in the Project Area.

Environmental Consequences of the No Action Alternative: Under the No Action Alternative, the proposed wells and supporting infrastructure would not be approved. Thus under the No Action Alternative, impacts to terrestrial wildlife resulting from ongoing energy development activities in the Yellow Creek Field would remain unchanged from current levels and trends.

Mitigation: The YCF 11-41 and 12-32 locations would be subject to timing limitations designed to reduce the extent and intensity of disturbance on mule deer severe winter ranges. No disruptive activities, including but not limited to pad/road/pipeline construction, drilling and completion operations, and installation of production equipment would be allowed between 1 January and 30 April.

During reclamation, protective fences would be installed around reseeded well pads to reduce the possibility of foraging by wild horses and livestock, thereby allowing for proper vegetation reestablishment. Protective fences would be built to current Type-D BLM fence standards. These fences would be maintained until the reseeded areas achieve the desired density and are mature enough to withstand the pressure of foraging.

To limit unrestricted vehicular use on access routes on deer winter ranges, the proponent would be responsible for installing and maintaining locked gates (with wings as necessary) to limit vehicular access on those routes associated with proposed location YCF 4-44-1. Access to the proposed YCF 11-41-1 and 12-32-1 locations currently originates from gated access to the YCF 1-35-1 location. Access on these roads would be strictly limited to those persons directly associated with well development, maintenance, and production on a year-round basis.

Finding on Public Land Health Standard for Plant and Animal Communities (partial, see also Vegetation and Wildlife, Aquatic)***:*** Implementation of either the Proposed Action or No Action Alternative would not prevent lands in the Project Area from meeting the public land health standards for terrestrial animal communities. The Proposed Action is considered an incremental addition to those lands dedicated to mineral development, but would not detract measurably from continually meeting the public land health standard. Similarly, the No Action Alternative would not detract from continually meeting of the public land health standard.

OTHER NON-CRITICAL ELEMENTS:

For the following elements, only those brought forward for analysis will be addressed further. Table 16 lists these elements.

Table 16: Non-Critical Elements of the Human Environment

Non-Critical Element	NA or Not Present	Applicable or Present, No Impact	Applicable, Present and Brought Forward for Analysis
Access and Transportation			X
Cadastral Survey	X		
Fire Management			X
Forest Management			X
Geology and Minerals			X
Hydrology/Water Rights			X
Law Enforcement		X	
Noise		X	
Paleontology			X
Rangeland Management			X
Realty Authorizations			X
Recreation			X
Socio-Economics		X	
Visual Resources			X
Wild Horses			X

ACCESS AND TRANSPORTATION

Affected Environment: The Project Area is accessed by a network of roads including Highway 64 and Rio Blanco County roads 20, 83, 91, and 122. About 3 miles of resource roads, managed by the BLM and maintained by BOPCO, also exists within the Project Area. BOPCO is currently working with Rio Blanco County to put gravel in places along key segments of existing county roads experiencing road-deteriorating effects from heavy truck and super-heavy truck traffic.

Environmental Consequences of Proposed Action: The primary impacts from the Proposed Action would be associated with the increased industrial vehicle traffic on Rio Blanco County and BLM system roads to and within the Project Area and construction of new roads in the Project Area. Increased vehicle traffic would result in dust generation, road congestion, noise, accelerated deterioration of roads, and increased potential for vehicle accidents.

Vehicle types using Rio Blanco County and BLM systems roads related to the Proposed Action include light and moderate weight pick-up trucks, heavy loads and super-heavy vehicles (i.e., those vehicles capable of transporting drilling rigs). Trucks transporting needed water to a proposed well site could increase the total number of daily vehicle trips to approximately 285.

BOPCO's commitment to employing dust abatement activities, properly designed and maintained roads would reduce the impacts from increased road dust and to accelerated road deterioration. Other actions, including adherence to posted speeds, increased signage, etc., would minimize the potential risk for vehicle accidents.

Rio Blanco County would receive permit fees that would help defray annual maintenance and operational costs of county road upkeep. All of these actions would reduce impacts to access and transportation in the immediate area of the Project and the roads and highways leading to the Project Area.

Traditional users of Rio Blanco County and BLM roads within the Project Area could encounter higher levels of drilling, field development and construction-related vehicle traffic, depending on the activities occurring at the time. This impact could lessen the public's overall experience while in the area. However, this impact is seen as temporary and seasonal in nature. Once the proposed wells are drilled and into production, the daily number of vehicle trips to and in the Project Area will be substantially reduced.

Approximately 3 miles of new access road would be constructed under the Proposed Action. Adherence to guidance set out in the "Gold Book" to proper design, construct and maintain these roads would reduce impacts to the surrounding environment. Installation of locked gates along the access routes for the proposed YCF 4-44-1 would limit general public access to those roads designated as open to the public by the BLM, thus, reducing indirect impacts to the surrounding environment from unplanned and unwanted vehicle traffic.

Environmental Consequences of the No Action Alternative: Under the No Action Alternative, the proposed wells and supporting infrastructure would not be approved. Thus under the No Action Alternative, impacts to the existing transportation system from ongoing energy development activities in the Yellow Creek Field would remain unchanged from current levels and trends.

Mitigation: No mitigation measures are recommended for access and transportation.

FIRE MANAGEMENT

***Affected Environment*:** The six proposed BOPCO wells involved in the Proposed Action are all contained in the designated B6 Yellow Creek fire management polygon. This fire management polygon is an area where appropriate management response is required with an emphasis on minimizing fire growth. This fire management polygon experiences a significant amount of naturally-ignited fires during the course of the summer as the vegetation is primarily an older growth pinyon-juniper woodland, intermixed with sagebrush and grass. Access to the Project Area would traverse through an old chaining project currently dominated by stands of dead and down pinyon and juniper trees.

Environmental Consequences of the Proposed Action: Removal of existing pinyon and juniper tree cover would be associated with BOPCO's proposed YCF 4-44-1, 11-41-1, 12-32-1, and 32-12-1 wells. A build-up of cleared and dried tree material from these proposed sites would result in an elevated hazardous fuels condition for many years or until the woody material is removed from the site. Adherence to the applicant-committed protection measures for forest management (refer to Table 2) would minimize the build-up of hazardous fuel conditions from cleared trees in these areas.

The National Fire Plan calls for “firefighter and public safety” to be the highest priority for all fire management activities. In the pinyon, juniper, and brush types common on the WRFO, roads and other man-made openings are commonly used as fuel breaks or barriers to control the spread of both wildland and prescribed fires. By reducing the activity fuels created from this proposal, future fire management efforts in this area should be safer for those involved and more effective.

Environmental Consequences of the No Action Alternative: None.

***Mitigation*:** The following mitigation measures would further reduce impacts from uncontrolled fires and should be incorporated as Conditions of Approval in the final authorizations.

Woody material to be removed from the site will be stock piled to a size not exceeding 20 percent of ground cover.

Excess woody material will be treated in one of the following methods:
A hydro-ax or other mulching type machine could be used to remove the trees. The machines are capable of shredding trees up to 12" in diameter and 15' tall as well as mowing brush like a conventional brush beater. It generally leaves small branches and pieces of wood from pencil size up to bowling ball size and the mulch is evenly scattered across the surface. This would effectively breakdown the woody fuel and scatters the debris thereby eliminating any hazardous fuel load adjacent to the pipelines, new roads and well pads.
Cut trees and have them removed for firewood, posts, or other products. The branches and tops should be mulched with a chipper or lopped and scattered to a depth of 18 inches or less. If the products are left for collection by the general public, they should be stacked in small manageable piles along the roadside or pad to facilitate removal.

During construction of roads, pipelines and the well pad, there shall be one 10 lb A/B/C rated fire extinguisher, one shovel and/or Pulaski or axe for each piece of equipment on site and ready for use in the event of an accidental fire ignition as a result of construction. No fire suppression actions shall be taken on any other fires in the area unless directed by the incident commander. In the event of an accidental ignition or other fire in the area, the contractor or a representative will contact Craig Fire Dispatch at 970-878-5037 so that a qualified fire crew can evaluate the situation for the safety of all crews in the area.

FOREST MANAGEMENT

Affected Environment: Five of the proposed well pads would involve mature and middle-aged pinyon-juniper woodlands. These stands have been rated as having commercial value. The White River RMP/ROD permits up to 45 acres per year, or 450 acres per decade, for clear cutting of woodlands.

Woodland diseases and pests do exist in this area, but are considered within normal disturbance regime levels. These pests include: pinyon pine beetle (*Ips confusus*), black stain root fungus (*Leptographium wageneri*), and a species of tussock moth (*Dasychira sp.*) which affects junipers. There is the opportunity for an increase in insects or pathogens as a result of an increase of slash or through direct damage of trees by construction.

Environmental Consequences of Proposed Action: Under the Proposed Action about 28 acres of woodland would be removed. Table 18 below provides an estimate of the cordage that would result from development of five of the proposed wells.

Table 18: Estimated Cordage Involved with BOPCO's Proposed Six Wells

Well No.	Well Pad (Acres)	Cords	Access Road and Pipeline		Cords	Total Cords
			Feet	Acres		
YCF 4-44-1	3.74	38.2	165	.11	1	39.2
YCF 11-41-1	3.69	36.9	2,686	1.85	27.3	65.7
YCF 12-32-1	3.68	36.8	3,147	2.2	39.6	76.4
YCF 32-12-1	4.43	4.5	598	.41	.4	4.9
TOTAL Cords						**186.2**

Source: BLM WRFO working data.

The removal of woodland resources is within the limit established within the land use plan. Following reclamation, pinyon and juniper are expected to reoccupy the site and develop into mature woodlands. Establishment is expected to take up to 30 years with mature woodlands developing in 250+ years.

Removal of mature and middle-aged pinyon and juniper trees would reduce the potential for outbreak of woodland diseases and pest infestations. Removal of pinyon and juniper trees in areas historically included in sagebrush and grass communities would increase the open areas preferred as foraging areas by wildlife, livestock and wild horses. Implementation of applicant-committed protection measures for forest management (refer to Table 2) and acceptance of mitigation measures outlined for fire management would reduce the build-up of cleared woody material from the Project Area, reducing the likelihood of contributing to possible catastrophic fire events.

Environmental Consequences of the No Action Alternative: Under the No Action Alternative, the proposed wells and supporting infrastructure would not be approved. Thus under the No Action Alternative, impacts to forest management resulting from ongoing energy development activities in the Yellow Creek Field would remain unchanged from current levels and trends.

Mitigation: At least 48 hours prior to any construction of the well pad, access road, and pipeline associated with YCF 11-41-1 and 12-32-1, a BLM Natural Resource Specialist will be notified and a monitor will be on site to ensure old-growth trees are avoided.

GEOLOGY AND MINERALS

Affected Environment: Geology: The Project Area is located within the northern province of the Piceance Basin, which has an areal extent of approximately 1,600 square miles. Surface elevations within the Piceance Basin range from about 5,705 feet at the confluence of Piceance Creek and the White River, to over 8,500 feet on the Roan Plateau. The topography in the Project Area is highly dissected with local relief ranging from about 200 to 600 feet. The northern portion of the basin has been eroded into a topographic basin by the drainages of Yellow Creek and Piceance Creek, which are tributaries to the White River.

The Piceance Basin is a broad, asymmetric, southeast-northwest trending structural basin consisting of a series of alternating anticlines and synclines. The deepest part of the basin is associated with the Red Wash Syncline, which parallels the northern boundary of the basin, and the South Rangely Syncline. The two synclines are separated by the broad Rangely Anticline.

Deposition of sediments into this region began with the downwarping of the basin floor in the Cretaceous Era and continued into Eocene time. Low stream gradients and moderate uplift of the marginal mountains prevented significant erosion of the basin's perimeter. This sequence of events resulted in the creation of the Wasatch, Green River, and Uinta Formations in and around a series of landlocked lakes (Tweto 1983).

Numerous lineations associated with joints, fractures, normal faults, and grabens are present in the northern portion of the Piceance Basin. The Project Area is located in the transitional area between the Piceance Basin axis to the east and the Douglas Creek Arch to the west. Strata within the Project Area dip an average of 6 degrees to the east.

The Piceance Basin contains stratified sediments ranging in age from Cambrian through middle Tertiary. The northern half of the basin is deepest and has the thickest stratigraphic sequence. The overall thickness of sediments is about 24,000 feet in the center of the basin.

Tertiary sedimentary deposits within the basin are about 8,000 feet thick and consist of the Uinta, Green River, and Wasatch Formations. The Uinta Formation outcrops throughout much of the basin and covers much of the surface of the Project Area, especially on the ridge tops. The Uinta Formation consists of sandstones with interlayered sequences of siltstones and marly siltstones. The sandstones are massive, usually devoid of visible stratification, and generally fine- to medium-grained. The interbedded siltstones and marly siltstones tend to be tabular with indistinct stratification. The Uinta Formation exceeds 1,400 feet in thickness near the center of the basin.

The Green River Formation is divided into four members: the Parachute Creek, Garden Gulch, Douglas Creek, and Anvil Points Members. In addition, rock units referred to as the Tongues of the Green River Formation are interfingered with the lower part of the Uinta Formation. The Green River Formation is about 2,000 feet thick near the center of the basin and conformably overlies the Wasatch Formation. The Parachute Creek Member is the uppermost unit of the Green River Formation and consists of marlstone and lean to rich oil shale, some of which

contains nahcolite and halite. The Parachute Creek Member contains virtually all of the oil shale, nahcolite, and dawsonite resources in the Piceance Basin.

The Wasatch Formation reaches a maximum thickness of about 5,500 feet. In the southern portion of the basin, the Wasatch Formation is subdivided into the Shire, Molina, and Atwell Gulch Members. The Shire Member contains variegated siltstone, claystone, and sandstones. The Molina Member is dominated by massive, cross-bedded sandstone. The basal Atwell Gulch Member is composed of variegated siltstone and claystone. The base of the Tertiary section is composed of a thin conglomerate known as the Fort Union Formation.

These Tertiary rocks unconformably overlie the Cretaceous Mesaverde Group, which includes the Fox Hills Sandstone, Lewis Shale, and Williams Fork Formation. The Mesaverde Group is composed of mudstones and sandstones with coal beds and ranges in thickness from about 3,000 to over 7,000 feet. These rocks were deposited during periods of sea level regression within the Cretaceous interior seaway.

Quaternary alluvium is present in the floor of the major valleys within the Project Area and consists of unconsolidated sand, gravel, and clay derived primarily from the Uinta Formation. These deposits range from near zero to about 140 feet thick (Robson and Saulnier 1981). The alluvium is highly permeable and is locally an important aquifer in the stream valleys, except where thick clay deposits exist (Weeks et al. 1974).

Minerals: Mineral resources within the Piceance Basin include oil and gas deposits, major deposits of oil shale, the world's largest deposits of natural sodium bicarbonate (nahcolite), and minor sand and gravel.

Oil and gas deposits are found throughout the Piceance Basin, and the entire area is considered to be a potential resource. Oil and gas production is from both structural and stratigraphic traps. Current gas production from the Piceance Basin is generally from small, subparallel northwest-trending folds. Within the Yellow Creek Field there are currently 18 producing gas wells.

The Green River Formation in the Piceance Basin contains an estimated 1,200 to 1,800 billion barrels of shale oil (BLM 1994; Robson and Saulnier 1981). The Parachute Creek Member of the Green River Formation contains the majority of the oil shale resource, and the upper Garden Gulch Member also contains some kerogen-bearing rock. The Parachute Creek Member is 900-1,200 feet thick at the southern and western margins of the basin and about 1,900 feet thick in the center of the depositional center of the basin, east of the Project Area. The richest oil shale interval is referred to as the Mahogany Zone. This zone is 100-200 feet thick and extends to all margins of the basin.

The Project Area is identified in the White River RMP/ROD as available for multi-mineral leasing (BLM 1997). Attempted development of the oil shale occurred at two lease tracts within the basin in the 1970s and 1980s. Tract C-a is located to the southwest of the Project Area along tributaries to Yellow Creek, and Tract C-b is located south of the Project Area near Willow Creek. Both lease tracts attempted to develop oil shale resources from the Mahogany Zone. To

date, long term economic recovery of kerogen from oil shale has not occurred. Nevertheless, oil shale is regarded as a valuable potential resource for the future.

Limited amounts of salable minerals are located within the Project Area. These minerals include sand, gravel, and sandstone. Sand and gravel are found in Quaternary alluvial deposits located along the stream valleys. Sandstone is quarried from the Uinta Formation. These materials are used for road construction and maintenance in the basin.

Potential building stone and rip-rap material are located throughout the Project Area. Nearly all resistant rock formations are considered to be a potential source of stone and rip-rap

Environmental Consequences of Proposed Action: Geology: Potential impacts to geologic resources from the Proposed Action include changes to the local topography and slope stability issues. The proposed well pads would be located on the side slopes of various ephemeral drainages in the Project Area, and would be excavated into the bedrock of the Uinta Formation in some cases. The well pad excavations would change the local topography to include square- or rectangular-shaped cuts and fills on side slopes in the Project Area. Depending on the slopes involved, excavation of well pads and access roads could leads to slope instability. This instability could lead to slumping of material adjacent to the well pad and roads. The slumps would likely occur following rainstorms or during snowmelt.

For well pads YCF 12-32-1, 32-12 and portions of the access roads to these sites and well pad YCF 11-41-1, Controlled Surface Use Stipulation -1 of the White River RMP/ROD (Fragile and Saline Soils and Steep Slopes) would apply. Controlled Surface Use Stipulation -1 states that a construction/reclamation plan must be submitted for these areas and include methods to restore soil productivity and manage surface water runoff.

Minerals: Potential impacts to oil and gas resources include the depletion of these resources due to extraction from the six proposed wells. Depletion of natural gas resources would be considered an irreversible effect.

Development related to the Proposed Action could potentially conflict with future multi-mineral development.

Potential impacts to salable mineral resources include the depletion of sand and gravel deposits due to construction activities for the proposed project. These salable minerals would be purchased from private sources outside the Project Area.

Environmental Consequences of the No Action Alternative: Under the No Action Alternative, the proposed wells and supporting infrastructure would not be approved. The existing slope conditions would continue and the natural gas resources would remain available for future extraction. Thus under the No Action Alternative, impacts to mineral resources, including sodium or salable minerals resulting from ongoing energy development activities in the Yellow Creek Field would remain unchanged from current levels and trends.

Mitigation: No additional mitigation measures are proposed for geology because the Proposed Action and applicable surface stipulations would minimize the potential for topographic and slope failure impacts. There are no mitigation measures necessary to protect sodium or salable mineral resources.

PALEONTOLOGY

***Affected Environment*:** Proposed BOPCO YCF 28-44-1 well, access and well tie pipeline route: The proposed well location, access and well tie pipeline routes are in an area generally mapped as the Uinta Formation (Tweto 1979) which the BLM, WRFO has classified as a Condition I/PFYC 4 formation, meaning it is known to produce scientifically important fossil resources. The well location, access and well tie pipeline have been inventoried at the Class III (100% pedestrian) level for fossil resources (Sandau 2006b, Compliance Dated 10/04/2006) with no fossils noted on the surface.

Proposed BOPCO YCF 11-41-1 well, access and well tie pipeline route: The proposed well location, access and well tie pipeline routes are in an area generally mapped as the Uinta Formation (Tweto 1979) which the BLM, WRFO has classified as a Condition I/PFYC 4 formation, meaning it is known to produce scientifically important fossil resources. The well location, access and well tie pipeline have been inventoried at the Class III (100% pedestrian) level for fossil resources (Sandau 2006b, Compliance Dated 10/04/2006) with no fossils noted on the surface.

Proposed BOPCO YCF 12-32-1 well, access and well tie pipeline route: The proposed well location, access and well tie pipeline routes are in an area generally mapped as the Uinta Formation (Tweto 1979) which the BLM, WRFO has classified as a Condition I/PFYC 4 formation, meaning it is known to produce scientifically important fossil resources. The well location, access and well tie pipeline have been inventoried at the Class III (100% pedestrian) level for fossil resources (Sandau 2006b, Compliance Dated 10/04/2006) with no fossils noted on the surface.

Proposed BOPCO YCF 28-23-1 well location, access and well tie pipeline route: The proposed well location, access ad well tie pipeline routes are in an area generally mapped as the Uinta Formation (Tweto 1979) which the BLM, WRFO has classified as a Condition I/PFYC 4 formation, meaning it is known to produce scientifically important fossil resources.

Proposed BOPCO YCF 4-44-1 well, access and well tie pipeline route: The proposed well location, access ad well tie pipeline routes are in an area generally mapped as the Uinta Formation (Tweto 1979) which the BLM, WRFO has classified as a Condition I/PFYC 4 formation, meaning it is known to produce scientifically important fossil resources. The proposed well location, access and well tie pipeline route has been inventoried at the Class III (100% pedestrian) level (Sandau 2006a, Compliance Dated 8/18/2006) with no fossil noted on the surface.

Proposed BOPCO YCF 32-12-1 well, access and well tie pipeline route: The proposed well location, access and well tie pipeline routes are in an area generally mapped as the Uinta Formation (Tweto 1979) which the BLM, WRFO has classified as a Condition I/PFYC 4 formation, meaning it is known to produce scientifically important fossil resources. The well location, access and well tie pipeline have been inventoried at the Class III (100% pedestrian) level for fossil resources (Sandau 2006b, Compliance Dated 10/04/2006) with no fossils noted on the surface.

Environmental Consequences of the Proposed Action: Proposed BOPCO YCF 28-44-1 well location, access and well tie pipeline route: If it becomes necessary to excavate into the underlying rock formation to construct the road, level the well pad, excavate the reserve/blooie pit or bury the well tie and/or produced water pipelines there is the potential to impact scientifically important fossil resources.

Proposed BOPCO YCF 11-41-1 well location, access and well tie pipeline route: If it becomes necessary to excavate into the underlying rock formation to construct the road, level the well pad, excavate the reserve/blooie pit or bury the well tie and/or produced water pipelines there is the potential to impact scientifically important fossil resources.

Proposed BOPCO YCF 12-32-1 well location, access and well tie pipeline route: If it becomes necessary to excavate into the underlying rock formation to construct the road, level the well pad, excavate the reserve/blooie pit or bury the well tie and/or produced water pipelines there is the potential to impact scientifically important fossil resources.

Proposed BOPCO YCF 28-23-1 well location, access and well tie pipeline route: If it becomes necessary to excavate into the underlying rock formation to construct the road, level the well pad, excavate the reserve/blooie pit or bury the well tie and/or produced water pipelines there is the potential to impact scientifically important fossil resources.

Proposed BOPCO YCF 4-44-1 well location, access and well tie pipeline route: If it becomes necessary to excavate into the underlying rock formation to construct the road, level the well pad, excavate the reserve/blooie pit or bury the well tie and/or produced water pipelines there is the potential to impact scientifically important fossil resources.

Proposed well location, access and well tie pipeline route: If it becomes necessary to excavate into the underlying rock formation to construct the road, level the well pad, excavate the reserve/blooie pit or bury the well tie and/or produced water pipelines there is the potential to impact scientifically important fossil resources.

Proposed BOPCO YCF 32-12-1 well location, access and well tie pipeline route: If it becomes necessary to excavate into the underlying rock formation to construct the road, level the well pad, excavate the reserve/blooie pit or bury the well tie and/or produced water pipelines there is the potential to impact scientifically important fossil resources.

Environmental Consequences of the No Action Alternative: There would be no new impacts to fossil resources under the No Action Alternative.

***Mitigation*:** BOPCO proposed well locations, access and well tie pipeline routes: The operator is responsible for informing all persons who are associated with the project operations that they will be subject to prosecution for knowingly disturbing paleontological sites, or for collecting fossils. If fossil materials are uncovered during any project or construction activities, the operator is to immediately stop activities in the immediate area of the find that might further disturb such materials, and immediately contact the authorized officer (AO). Within five working days the AO will inform the operator as to:

- whether the materials appear to be of noteworthy scientific interest
- the mitigation measures the operator will likely have to undertake before the site can be used (assuming in situ preservation is not feasible)

If the operator wishes, at any time, to relocate activities to avoid the expense of mitigation and/or the delays associated with this process, the AO will assume responsibility for whatever recordation and stabilization of the exposed materials may be required. Otherwise, the operator will be responsible for mitigation cost. The AO will provide technical and procedural guidelines for the conduct of mitigation. Upon verification from the AO that the required mitigation has been completed, the operator will then be allowed to resume construction.

An approved paleontological monitor shall be present anytime it becomes necessary to excavate into the underlying rock formation to construct the road, level the well pad, excavate the reserve/blooie pit or bury any of the associated pipelines to the well.

RANGELAND MANAGEMENT

Affected Environment: Portions of two grazing allotments occur within the Project Area (Appendix A, Figure 5). The Square S allotment (#06027) occurs in the Project Area on the east side of Yellow Creek, and the Yellow Creek allotment (#06030) occurs on the west side of Yellow Creek. These two allotments in the Project Area are grazed by cattle most of the year. Details on each allotment within the Project Area are summarized in Table 19 below.

Table 19: Grazing Allotment Information in the Project Area

Allotment Name	Type	Use Period	Total BLM Allotment Acres	Total Allotment Acres	Allotment Acres in the Project Area	AUMs in the Project Area
Square S	Cattle	Year Long	64,050	3,522	4,409	242
Yellow Creek	Cattle	4/15-1/31	63,191	2,725	8,441	364
		Total	**127,241**	**6,247**	**12,850**	**606**

Source: BLM 2008, Rangeland Administration System (RAS)

An animal unit month (AUM) is defined as "the amount of forage necessary to sustain one cow and one calf or its equivalent for one month" (BLM 1996). Between the two allotments, there are approximately 606 livestock AUMs on 12,850 acres of land allotted for grazing within the Project Area.

All allotments have been placed in one of three management categories to establish priorities for management: improvement, maintenance and custodial. Both the Square S and Yellow Creek

allotments have been placed in the improvement category (BLM 2008). Designation of categories is dynamic and based on rangeland conditions, present and potential resource production, resource use and conflict, and the opportunity for economic returns from public investment. Of the 144 grazing allotments affected by the White River RMP/ROD, 54 of them have been placed in the "improve" category, and have been identified for development of allotment management plans (BLM 1997). At the time the Resource Management Plan was finalized, allotment management plans were developed for 19 of the 54 improve allotments. At the time the RMP/ROD was finalized, the Yellow Creek allotment did not have an allotment management plan, but the Square S allotment did have an allotment management plan (BLM 1997).

In addition, the proposed joint access road to YCF 11-41-1 and 12-32-1 would cross an existing cattle fence.

Environmental Consequences of Proposed Action: The Proposed Action would initially result in the removal of approximately 31 acres of vegetation (involving 1.5 livestock AUMs) in grazing allotments in the Project Area. Successful interim reclamation, as described in the Reclamation Plan (Appendix B), would reduce the initial surface disturbance by approximately 50 percent on well pads and would reduce pipeline and road ROW widths from 30 to 18 feet. As such, residual surface disturbance in the Project Area would be approximately 16 acres of vegetation (involving approximately 0.76 livestock AUMs) in grazing allotments in the Project Area for the LOP. Table 20 below provides a breakdown of the estimated loss of livestock AUMs by grazing allotment. As shown, activities under the Proposed Action would result in the initial, or short-term, loss of 0.3 percent, and long-term loss of 0.2 percent, of grazing allotment acres in the Project Area.

Indirect effects to livestock grazing could consist of reduced forage quality due to potential weed infestations, and potential traffic delays to ranchers accessing the Project Area during construction and drilling phases.

Table 20: Estimated Livestock AUMs Affected by the Proposed Action

Allotment Name	Total Allotment Acres in the Project Area	Initial Loss of Acres in the Project Area (% of Total Acres in the Project Area)	Initial Loss of AUMs in the Project Area	Residual Loss of Acres in the Project Area (% of Total Acres in the Project Area)	Residual Loss of AUMs in the Project Area
Square S	4,409	14 (0.3 %)	0.66	7 (0.2 %)	0.33
Yellow Creek	8,441	17 (0.2 %)	0.8	9 (0.1 %)	0.43
Total	**12,850**	**31 (0.2 %)**	**1.46**	**16 (0.2 %)**	**0.76**

Source: BLM 2008, Rangeland Administration System

Certain actions under the Proposed Action would reduce impacts to authorized livestock management operations. These include revegetation of disturbed areas, implementation of noxious weed control and monitoring. The cattle fence that would be disturbed by the proposed joint access road to YCF 11-41-1 and 12-32-1 would be braced on either side of the fence, and a cattle guard would be installed to prevent the movement of livestock.

Environmental Consequences of the No Action Alternative: Under the No Action Alternative, the proposed wells and supporting infrastructure would not be approved. Thus under the No Action Alternative, impacts to rangeland management resulting from ongoing energy development activities in the Yellow Creek Field would remain unchanged from current levels and trends.

Mitigation*:* To further minimize impacts to rangeland management, the following actions should be incorporated into Conditions of Approval for each of the final authorization.

Where the proposed joint access road to YCF 11-41-1 and 12-32-1 crosses the existing pasture boundary fence, install a minimum 20-foot wide cattleguard to BLM specifications for the lifetime of the project. All cattleguard/fence installation would take place prior to well location, pipeline or facility construction. A minimum 16-foot wide gate would be installed next to the cattleguard to allow passage for livestock/heavy equipment. All fence construction would be completed to BLM specifications.

To offset possible interference or disruption of livestock grazing patterns and distributions, BOPCO could work with the BLM and individual grazing permittees to identify and construct additional surface water structures, e.g., water catchments, stock water tanks, etc.

REALTY AUTHORIZATIONS

Affected Environment: According to the BLM's LR2000 database, there are several authorized or pending land uses on Federal lands and/or minerals within the Project Area including oil and gas leasing and ROWs. BOPCO has existing ROWs in the Project Area: COC67003 for access roads, COC68980 for natural gas gathering pipelines, and COC68981 for water lines. Other linear ROWs are predominately oil and gas associated roads and pipelines for Dominion Pipeline, Williams, and Bargath. COC69581 is the White River Electric power line to the Yellow Creek Plant and Rio Blanco County Road Nos. 122 and 20 bisect the Project Area.

Environmental Consequences of Proposed Action: The intersection of County Road No.122 and the access road to the YCF 32-12-1 well is located off-lease. The inlet to the Yellow Creek Plant is located off unit in T1S, R98W, Section 1. The off-lease segments of the access road, gas pipeline, and water line would be authorized by amendment to existing ROWs. Table 21, below, summarizes the involvement of the Proposed Action with existing ROWs.

Table 21: Summary of Existing Realty Authorizations Involved with the Proposed Action

Well No.	Road – COC67003		Gas Line - COC68980		Water Line - COC68981	
	w x l, in feet	Acres	w x l, in feet	Acres	w x l, in feet	Acres
YCF 4-44-1	On lease	--	--	--	---	--
YCF 11-41-1	On lease	--	--	--	--	--
YCF 2-32-1	On lease	--	--	--	--	--
YCF 28-23-1	On unit	--	--	--	--	--
YCF 28-44-1	On Unit	--	--	--	--	--
YCF 32-12-1	120 x 30	0.083	120 x 35	0.096	120 x 15	0.041
Total		**0.083**		**0.096**		**0.041**

Source: BLM's LR2000 database, as of April 2008.

Under the Proposed Action, BOPCO could transport water used for drilling and completion activities via pipeline. All pipelines would be temporarily laid on the surface within the barrow ditches of existing and proposed roads for a period of approximately 30 days. Use of temporary water lines on lease would not require authorization of any additional ROWs. A permit for a Temporary Work Area would be required if a surface line for the proposed YCF 32-12-1 well would follow the access road or if a line transports water between wells that are off-unit or off-lease. If a line follows a Rio Blanco County Road, the County should be contacted for safety guidance.

Environmental Consequences of the No Action Alternative: Under the No Action Alternative, the proposed wells and supporting infrastructure would not be approved or constructed, resulting in no additional impacts.

Mitigation: Authorization of off-lease access roads is required before construction of the well pad may begin. The holder is responsible for obtaining appropriate permits from State and local governments including Rio Blanco County and CDOW.

RECREATION

Affected Environment: The Project Area is part of the White River Extensive Recreational Management Area (ERMA), which is managed to provide the public with a broad spectrum and diversity of unstructured outdoor recreational opportunities.

Recreational use of lands within the Project Area is best characterized as dispersed. There are no developed recreation sites or facilities. Recreational opportunities within the Project Area include primitive camping, hiking, horseback riding, off-highway vehicle (OHV) use, hunting, cultural resource study, and wildlife viewing. Recreational use of the Project Area is limited, with the highest use occurring during the fall big game hunting season.

According to the White River RMP/ROD, motorized vehicle use is limited to existing roads, ways, and trails within the majority of the Project Area. Within the portions of the Duck Creek ACEC that overlap the Project Area (approximately 1,000 acres), motorized vehicle use is limited to designated roads and trails in order to protect sensitive resources.

Environmental Consequences of Proposed Action: Implementation of the Proposed Action would result in the direct loss of approximately 31 acres of Federal land that are currently available for recreation in the White River ERMA. Indirect effects to recreation from natural gas development would consist of diminished recreational experience due to the presence of natural gas facilities and increases in human activity within the Project Area. Adverse impacts would be particularly felt by visitors seeking solitude or recreational opportunities in a relatively natural appearing landscape (e.g., hiking, horseback riding, and wildlife viewing).

Adverse impacts to hunting would primarily occur during the development phase in isolated areas where construction, drilling, and completion activities are occurring.

Construction of 3 miles of new roads within OHV limited areas would increase road density, expand the number of roads open for motorized vehicle use, and provide recreational users with increased access to broader portions of the Project Area. The addition of roads could potentially expand road-related recreational opportunities (e.g., OHV use and hunting). However, it should be noted that all new roads would terminate at proposed well locations and no new loop roads would be created by implementing the Proposed Action. No development is proposed within the Duck Creek ACEC; therefore, there would be no road construction in areas where motorized vehicle use is currently limited to designated roads and trails.

Environmental Consequences of the No Action Alternative: Under the No Action Alternative, the proposed wells and supporting infrastructure would not be approved. Thus under the No Action Alternative, impacts to recreation use resulting from ongoing energy development activities in the Yellow Creek Field would remain unchanged from current levels and trends.

Mitigation: There are no recommended mitigation measures for recreation.

VISUAL RESOURCES

Affected Environment: The Project Area consists of rolling topography in the middle and foreground viewing distance with mountains in the background viewing distance. The landscape is dominated by pinyon and juniper woodlands. At higher elevations, the woodlands are interspersed with open grasslands. At lower elevations (e.g., surrounding Yellow Creek), woodlands are interspersed with an understory of sagebrush.

As discussed in Chapter 2**,** there are 18 existing wells in the Project Area which have introduced new elements of line, form, color, and texture into the landscape. In addition to existing oil and gas facilities, other visually noticeable human imprints include an existing road network and dispersed livestock management facilities (i.e., fencing). Within the Project Area, topographic and vegetative features provide some visual screening, which reduces the amount of visual contrast and provides the viewer with a predominantly natural appearing landscape.

According to the White River RMP/ROD, the entire Project Area has been designated by the BLM as VRM Class III. The objective of VRM Class III is to partially retain the existing character of the landscape. The level of change to the landscape should be moderate.

Environmental Consequences of Proposed Action: Implementation of the Proposed Action would result in an increase in gas-production facilities that would further modify the characters of the visual landscape (i.e., the line, form, color and texture). Visual resource impacts in the Project Area are analyzed in terms of consistency of the Proposed Action with the existing VRM classification.

The construction and operation of natural gas facilities and associated features such as roads and pipelines would result in both short-term and long-term impacts to all characters of the

landscape. The generally undulating topography for both the near, mid and far-views would be directly affected by the construction and operations of new linear intrusions (i.e., 3 miles of new roads and pipeline ROWs; cut and fill areas associated with well pads, etc.) Exposure of new bare ground in previously vegetated areas would introduce changes to the near, mid and far-view of the Project Area's predominate colors of sage green and dark woodland green. Nighttime drilling activities would involve safety lighting, breaking up the generally black effect of night in the Project Area. Increased dust from activities conducted on bare ground would visually detract from the near-view along roadways. A rooster-tail dust plume following vehicles travelling existing roads within the project Area would result in visual change in the color, and texture of the far-view landscape. The Proposed Action would disturb approximately 31 acres, of which 15 acres (or about 48 percent) would be involved in the short-term, interim reclamation actions designed to further minimize disturbance for the life of the well (or 20 years). Final reclamation actions would be completed on the remaining 16 acres after the life of the well. Visual intrusions remaining after successful implementation of the short-term, interim reclamation actions would remain for the long-term, estimated to be 25 years.

Applicant-committed protection measures for dust abatement, minimizing surface disturbance, implementation of the interim and final reclamation measures outlined in the reclamation plan, SWMP measures, painting of production facilities, etc., would minimize direct, indirect, short- and long-term impacts to the visual landscape to allow the Project Area to remain consistent with the assigned VRM Class III classification.

Environmental Consequences of the No Action Alternative: Under the No Action Alternative, the proposed wells and supporting infrastructure would not be approved. Thus under the No Action Alternative, impacts to the visual landscape resulting from ongoing energy development activities in the Yellow Creek Field would remain unchanged from current levels and trends.

Mitigation: No additional mitigation measures are recommended for visual resources.

WILD HORSES

Affected Environment: The portion of the Project Area located west of Yellow Creek includes approximately 8,442 acres (or roughly 4 percent) of the 190,130 acre Piceance-East Douglas Herd Management Area (HMA) (Appendix A, Figure 6) This portion of the HMA, which contains prime yearlong wild horse habitat, is primarily comprised of stony foothills and pinyon-juniper woodlands. Pinyon-juniper woodlands provide cover habitat required by horses. Use of this cover type is more predominant during the summer months for shade and during severe winter storms (BLM 1981).

The movement of wild horses in the HMA is largely influenced by seasonal factors, fences, access to water supplies, and available forage. Horses tend to concentrate on windswept ridges and south-facing slopes during periods of deep snow. During summer and early fall, water availability influences wild horse movement. Fences used to control livestock can deter the movement of wild horses between seasonal-use areas, thus interfering with the free-roaming

behavior of the herd. In addition, forage competition between wild horses, livestock, and wildlife species exists throughout the Project Area. Fecal studies conducted by Colorado State University in 1974 determined that the diet of wild horses within the Piceance Basin herd consisted of the following main plant species: sedge (*Carex* spp.), needle-and-thread grass (*Stipa comata*), wheatgrass (*Agropyron* spp.), and prairie junegrass (*Koeleria cristata*). A comparison of the diets among wild horses, cattle, and mule deer in the Piceance Basin showed a dietary overlap of 71 percent between wild horses and cattle, and 11 percent between wild horses and mule deer in the mountain shrub vegetation type. Within pinyon-juniper communities, comparison of these diets showed a 59 percent dietary overlap between wild horses and cattle, and a 2 percent dietary overlap between wild horses and mule deer (BLM 1981).

The current appropriate management level (AML) for the Piceance-East Douglas HMA is 165 animals (BLM 1999). Based on population models for the herd, an estimated population for the herd could be about 300 animals (based on personal communication, M. Kindall 2008).

Environmental Consequences of Proposed Action: Each of the proposed well locations could affect the Piceance-East Douglas wild horse herd as a result of the proposed development and increased human presence. Impacts to wild horses from oil and gas development have not been widely studied or documented. Inferences regarding potential impacts to wild horses utilizing the portion of the Piceance-East Douglas HMA in the Project Area are largely based on anecdotal information and observations of the effects of oil and gas activities on the herd, and on known impacts to other large mammals (e.g., mule deer and cattle) that are dependent upon similar habitats and forage within the Project Area.

Implementation of the Proposed Action could result in direct and indirect impacts to wild horses in the Project Area. Surface-disturbing activities associated with the development of specific wells (YCF 4-44-1, 28-23-1, 28-44-1 and 32-12-1) and their associated roads and pipelines would result in the direct, initial loss of approximately 17 acres of habitat cover and forage in the portion of the Piceance-East Douglas HMA in the Project Area. The overall loss of habitat function to wild horses in the Project Area would likely extend beyond this surface disturbance. Avoidance by horses of disturbed areas, noise, and human-related activities could occur and, therefore, the amount of suitable cover habitat and forage loss could potentially be larger than the acreage estimated above (i.e., habitat fragmentation would likely occur). Fragmentation of habitat could also restrict the herd's ability to access and utilize the entire HMA, particularly in areas where migration routes are altered or new fences are constructed for reclamation purposes. Proposed development on south-facing slopes or ridgelines could deter use of winter areas, whereas development adjacent to drainages (e.g., Yellow Creek) could reduce access to water sources. For horses that avoid development activity, lack of access to, or temporary displacement from, suitable forage, cover, water sources, and migration routes could lead to increased stress, increased densities in adjacent habitats, and increased forage competition with livestock and mule deer. For horses that do not avoid development activities, cattle guards could increase the potential for injuries to wild horses (e.g., hooves and legs caught in or through the brace assembly), and open trenches could increase the potential for horses to become trapped should they fall into an open trench. Further, increased traffic on access roads in the Project Area could also increase the potential for harassment of, and vehicle collisions with, wild horses.

Impacts to wild horses would likely be greatest if increased human presence associated with construction, drilling, and completion activities were to take place during the foaling period (March 1 through June 15). As intensive development activities would be delayed for a specified 60-day period from March 1 through June 15, as outlined by the White River RMP/ROD, impacts during this sensitive time period would be reduced. Other impacts to wild horses would be very similar to those identified and assessed for terrestrial wildlife species, above.

Successful interim reclamation, as described in the Reclamation Plan (Appendix B), would reduce the initial surface disturbance by approximately 50 percent on well pads and would reduce pipeline and road ROW widths from 30 to 18 feet. As such, residual surface disturbance in the portion of the Piceance-East Douglas HMA in the Project Area would be approximately 9 acres for the LOP.

Environmental Consequences of the No Action Alternative: Under the No Action Alternative, the proposed wells and supporting infrastructure would not be approved. Thus under the No Action Alternative, impacts to wild horses resulting from ongoing energy development activities in the Yellow Creek Field would remain unchanged from current levels and trends.

Mitigation: The following mitigation measures would further reduce impacts to wild horses and should be incorporated as Conditions of Approval in the final authorizations.

Prior to surface-disturbing activities, BOPCO and/or their contractors would determine if pregnant mares are present in the vicinity of proposed development sites. If BLM determines wild horses are in the vicinity of proposed development, development activities may be delayed for a specified 60 day period within the spring foaling period between March 1 and June 15. The lessee may also be required to perform special conservation measures within this area including: 1) Habitat improvement projects in adjacent areas if development displaces wild horses from critical habitat, 2) disturbed watering areas would be replaced with an equal source of water having equal utility, and 3) activity/improvements would provide for unrestricted movement of wild horses between summer and winter ranges.

Horseproof cattle guards would be constructed and maintained, as directed by the BLM, to reduce the potential for injuries to wild horses. Specifically, sucker rod or rebar would be tack welded (centered between the equally spaced rails) to each cross member for the entire length and width of the cattle guard. When driven across, the floor of the cattle guard would collapse level with the terrain, and would slowly retrieve upon exiting. Horseproof cattle guards would be painted a dark color to help with snow melt.

In wild horse use areas, open trenches for burial of gathering and water pipelines would be inspected daily to reduce the potential for horses to become trapped should they fall into a trench.

CUMULATIVE IMPACTS:

Direct, indirect, and cumulative effects of reasonably foreseeable oil and gas development were analyzed in the environmental impact statement associated with the White River Draft Resource Management Plan/Environmental Impacts Statement (DRMP/EIS) (BLM 1994). This White River DRMP/EIS addressed all reasonably foreseeable oil and gas development (including associated infrastructure) over a 20-year period. The developments set out in this EA, as well as cumulative impacts in the WRFO area, are within the scope and analysis of the existing White River DRMP/EIS. The cumulative analysis contained in this EA is tiered by reference to the cumulative impact analysis contained in the White River DRMP/EIS (BLM 1994). For purposes of assessment in this EA, the Cumulative Impact Analysis Area (CIAA) for most resources is the WRFO area is described in the White River DRMP/EIS. For some resources the CIAA is different and is indicated below.

A more current cumulative impact analysis was presented in the BLM's environmental assessment entitled *Piceance Development Project* (CO-110-2005-219-EA), completed in 2007. Table 22 below provides a summary of the surface disturbance estimated for past, present, and reasonably foreseeable development (RFD) projects in the CIAA as presented in this EA.

Table 22: Summary of Surface Disturbance Estimated for Past, Present, and Reasonably Foreseeable Energy-Related Projects in the CIAA

Activity	Description	Acres
Past and Present Projects		
Pipelines	361.9 miles	3,057
Gas Plants and Other Facilities	5 plants	50
Oil and Gas Pads, Including Access Roads and Flowlines		6,740
Other Mining/Development	4 projects	1,219
Subtotal, Existing Disturbance		**11,066**
Reasonably Foreseeable Projects		
Pipelines	390 miles	2,893
Gas Plants and Other Facilities	5	465
Oil and Gas Pads, Including Access Roads and Flowlines (2007-2010)		521
Other Mining/Development	3 projects	616
Subtotal Proposed Disturbance		**4,495**
Total Existing and Proposed Disturbance		**15,561**

Source: BLM, 2007c

Of the acreage originally disturbed by past and present projects, BLM estimates that about 57 percent were reclaimed to BLM standards, leaving a residual disturbance of about 43 percent. The Proposed Action assessed in this EA would be included in the reasonably foreseeable projects for the period 2007-2010. Assuming the Proposed Action would involve an initial disturbance of about 31 acres, it would constitute about 0.8 percent of the total anticipated acres disturbed for the period 2007 through 2010. The Proposed Action would constitute about 0.2

percent of the total existing and proposed disturbance from oil and gas development in the CIAA.

The potential cumulative impacts associated with each critical and non-critical element that must be addressed to meet the Public Land Health Standards are discussed below.

RESOURCE-SPECIFIC CUMULATIVE IMPACTS:

CRITICAL ELEMENTS

Air Quality: A cumulative air pollutant modeling study was performed by BLM and reported in the Piceance Development Project Environmental Assessment (BLM 2007). The study analyzed the NO_s, SO_2, PM_{10}, and $PM_{2.5}$ impacts for oil shale research and development projects located within the Piceance Basin and included projects adjacent to the Project Area. The modeling analysis used the AREMOD dispersion model with one year of meteorological data collected during 2004 at the Bar D site located in Township 1 South, Range 98 West. The study evaluated cumulative pollutant impacts throughout the Piceance Basin, SO_2 impacts at the Dinosaur National Monument, and all pollutant impacts as well as atmospheric deposition and visibility impacts to the Federally-mandated Class I Flat Tops Wilderness Area.

The results of the cumulative study indicated that all study parameters would be below all significance thresholds except visibility. The study predicted that the visibility reduction at Flat Tops would exceed the Limit of Acceptable Change (LAC) for 13 to 20 days. However, 10 to 14 of these days were predicted to occur in November through January when visitor use in Flat Tops is minimal. For the 3 to 6 days per year when visibility was predicted to exceed the LAC, 1 to 3 of these days experienced precipitation and attendant low level cloudiness so visibility restrictions would be associated with naturally occurring weather rather than excess pollutants. Given the relatively conservative nature of the AERMOD visibility screening methodology, it is possible that visibility impacts are less than predicted.

Areas of Critical Environmental Concern: For this analysis, the CIAA is the entire 3,430 acre Duck Creek ACEC, which was established to protect and enhance the relevant and important values of cultural resources and threatened and endangered plants (e.g., Dudley Bluffs bladderpod, Dudley Bluffs twinpod, and Ute Ladies'-tresses). As previously discussed, implementation of the Proposed Action or Alternative B would not directly or indirectly affect the Duck Creek ACEC. Therefore, the Proposed Action would not add to cumulative impacts.

Cultural Resources: The CIAA for cultural resources is defined as the Project Area. Impacts to cultural resources in the CIAA would primarily result from activities associated with surface and subsurface disturbance such as oil and gas development projects, recreational use/OHV travel, livestock management, and fire management. Impacts may, however, result from specific cultural resource management decisions and from non-surface-disturbing activities that create visual and/or auditory effects. These latter impacts would apply primarily to sites or locations deemed sacred or traditionally important by Native American Tribes and used by these groups in such a manner that visual obstructions and/or noise levels impinge upon that use.

Federal law requires that projects on Federal lands be preceded by cultural resource inventories. As cultural resource surveys would occur prior to any surface-disturbing activities under the Proposed Action in the Project Area, and as all identified cultural resources would be avoided or appropriately mitigated, direct, cumulative impacts to these resources are expected to be minimal. Indirect cumulative impacts could occur as a result of increased collection and vandalism due to increased access to the Project Area. Beneficial cumulative impacts would likely occur as undocumented cultural resources could be discovered and preserved.

Invasive, Non-Native Species: As of 1994, several noxious weed species had established approximately 2,635 acres of land in the CIAA (BLM 1994). Other noxious weed species could have established populations in the CIAA since that time. Ground-disturbing activities, including those related to the Proposed Action and other activities in the CIAA, allow invasive and noxious weeds to establish and spread. As described in the introduction of this section, approximately 11,066 acres have already been disturbed in the CIAA, and an additional 4,495 acres of disturbance are reasonably foreseeable within the CIAA. Implementation of the Proposed Action would constitute 0.9 percent of this RFD, and as such would incrementally contribute to cumulative impacts. Adherence to certain conditions of approval described in the White River RMP/ROD related to weed management would reduce these impacts.

Migratory Birds, Including Raptors: Assuming the Proposed Action would involve an initial disturbance of about 31 acres, the Proposed Action would constitute approximately 0.9 percent of the total anticipated oil and gas disturbance for the period 2007-2010, and approximately 0.2 percent of the total existing and proposed disturbance from oil and gas development in the CIAA. Other activities that could also result in adverse cumulative impacts include development of oil shale, coal, sodium, and other mineral resources; timber harvest; rangeland and wild horse management; recreation and motorized vehicle travel; lands and realty decisions; and fire management.

For migratory birds, this direct loss and/or fragmentation of nesting and foraging habitats would likely have a minimal impact based on the extent of similar habitats in the area. The use of nets over reserve pits would minimize the potential for birds to be affected by chemicals used during the drilling and completion process. For raptor species, such losses would also be minimal as spatial and seasonal stipulations would generally provide protection of ongoing nesting activities and would likely maintain the utility of nest habitats in the CIAA (BLM 1994).

Despite the measures described above, activities associated with the Proposed Action would incrementally add to impacts (such as those related to reduced pinyon-juniper forage and cover areas, reduced forage quality due to potential weed infestations, and fragmentation of habitat due to increased development-related traffic and surface disturbance) from other actions in the CIAA.

Threatened, Endangered, and Sensitive Animal Species: It should be noted that this analysis assumes cumulative impacts to special status wildlife and fishery species would be similar in nature to those discussed for terrestrial and aquatic wildlife species. Given their ongoing habitat losses, sensitivity to disturbances, and declining population numbers, special status wildlife and

fishery species would be expected to be more sensitive to impacts related to development within the CIAA than other, more common animal species.

Given such sensitivities, past, present, and reasonably foreseeable projects have reduced and would likely continue to reduce the quality and quantity of habitats in the CIAA for special status wildlife species. By conducting field surveys to determine the presence of special status wildlife species prior to surface-disturbing activities, and by implementing seasonal and spatial buffers, as directed by the BLM, such impacts could be reduced. Therefore, based on the minimal amount of surface disturbance associated with the Proposed Action and the extent of similar habitats within in the CIAA, direct and indirect impacts associated with the Proposed Action would incrementally add to past, present, and other RFD activities, which cumulatively may affect individual species, but would not likely result in a loss of viability of special status wildlife populations within the CIAA.

Water depletions associated with the Proposed Action, in combination with depletions from other activities in the CIAA, would reduce the ability of the Upper Colorado River Basin to create and maintain the physical and biological environment for the four endangered Colorado River fish. As such, water depletions associated with the Proposed Action would incrementally add to depletions from past, present, and other RFD activities, which cumulatively "*may affect, are likely to adversely affect*" the Colorado River fish and "*may affect, are likely to adversely affect*" their USFWS-designated critical habitats.

Threatened, Endangered, and Sensitive Plant Species: Nineteen special status plant species occur in the CIAA. Of those 19, eleven are restricted to the CIAA, meaning they do not occur anywhere else. Of the three special status plant species that have the potential to occur in the Project Area, one (the Ute Ladies'-tresses) does occur outside the CIAA, and two (the Dudley Bluffs bladderpod and Dudley Bluffs twinpod) occur only in the CIAA (BLM 1994).

Activities related to the Proposed Action, in addition to activities related to other actions in the CIAA, would incrementally add to cumulative impacts to special status plant species in the CIAA. Actions that could also result in adverse cumulative impacts include development of oil shale, coal, sodium, and other mineral resources; timber harvest; wildlife and horse management; livestock grazing; recreation and motorized vehicle travel; lands and realty decisions; and fire management. Impacts related to these actions include loss of suitable or occupied habitat; loss or modification of plant habitat due to the spread of invasive weed species; and an increase in fugitive dust, which may affect plant growth. Just as under the Proposed Action, stipulations and certain conditions of approval described in the White River RMP/ROD, would reduce these impacts. Assuming adherence to these stipulations and COAs, the Proposed Action, and other activities contributing to cumulative impacts, ***"may affect, are not likely to adversely affect"*** the Dudley Bluffs bladderpod, Dudley Bluffs twinpod, and Ute Ladies'-tresses.

Wastes, Hazardous or Solid: Accidental spills or leaks associated with equipment or pipeline failures, storage of fuel or other fluids could cause soil, and/or water contamination within the CIAA. The severity of the potential impacts, such as a spill, would depend on the quantity of fluids released and the proximity of the release to a water body or aquifer. The Proposed Action would increase contributions to solid waste landfills, contributing to cumulative impacts on solid

waste. As all past, present, and RFD projects would be required to comply with all applicable Federal, State, and local regulations hazardous waste cumulative impacts are not anticipated.

Water Quality, Surface and Ground: The Proposed Action would result in a slight increase in erosion rates and sediment yield, which combined with erosion associated with other oil and gas development, recreational activities (e.g., OHV use), livestock grazing, and mining, could have negative impacts on aquatic habitat within the affected drainages of Yellow Creek and the White River.

The Proposed Action, combined with other oil and gas development and increased recreational and mining activities, would slightly increase the chance that accidental spills of fuels, lubricants, or other petroleum products would occur and contaminate surface water or shallow groundwater within the CIAA. Spills of fuels or produced fluids from well pads and pipelines also have the potential to contaminate the shallow alluvial groundwater along Project Area drainages and the White River. Spills or leaks of natural gas condensate would have the greatest potential to contaminate surface water and shallow alluvial groundwater. The proposed wells would have no cumulative impacts on the upper and lower aquifers, assuming proper well completion and casing procedures are followed. Project-related water consumption would be a minor depletion to flows in the White River.

Wetlands and Riparian Zones: The extent of wetlands and riparian zones in the CIAA has not yet been fully inventoried. Based on BLM geospatial data, approximately 398 miles of linear features signifying riparian zones and wetlands occur in the CIAA. Of this number, 0.7 miles (or 0.2 percent) occur in the Project Area.

Activities related to the Proposed Action, in addition to other actions, would incrementally add to cumulative impacts to wetlands and riparian zones in the CIAA. Actions that could also result in adverse cumulative impacts include development of oil shale, coal, sodium, and other mineral resources; timber harvest; wildlife and horse management; livestock grazing; recreation and motorized vehicle travel; lands and realty decisions; and fire management. Impacts to wetlands and riparian zones related to these actions include increased sediment loading to these areas, a potential increase in noxious weeds, and a potential for spills and leaks from construction equipment.

Just as under the Proposed Action, stipulations and certain conditions of approval described in the White River RMP/ROD would reduce these impacts.

NON-CRITICAL ELEMENTS

Soils: Any surface-disturbing activity that removes native vegetation and topsoil can result in an increase in erosion rates. The Proposed Action would disturb an area of about 31 acres. Of the potential soil-disturbing activities, existing and proposed roads are the features of highest concern. Unlike surface and buried pipelines, active roadways are not reclaimed, thus sediment yield from roads can continue at rates two to three times above background rates into the indefinite future. The Proposed Action would create an additional 3 miles of unpaved roadway

in the CIAA. Additional BLM-authorized actions (oil and gas development, livestock grazing, prescribed burning, mining, and recreation) that could result in increased erosion and sediment yield within the CIAA.

Soils compacted on existing roads, new access roads, and well pads contribute slightly greater runoff than undisturbed sites. The increased runoff could lead to slightly higher peak flows in the White River, potentially increasing erosion of the channel banks. The increased erosion could increase turbidity in the river during storm events.

The construction of the project facilities would incrementally increase the chance that leaks or spills of fuels, lubricants, or natural gas condensate would occur within the CIAA. Spills of this nature could increase the loss of soil productivity within the area.

Colorado Public Land Health Standard 1 states that upland soils shall exhibit infiltration and permeability rates that are appropriate to soil type, climate, land form, and geologic processes. The Proposed Action would add to other actions that have a negative impact on the attainment of this standard, due to compaction and blending of soils in some locations.

Vegetation: As per the White River DRMP/EIS (BLM 1994), there are approximately 74,577 acres of grassland, 307,066 acres of sagebrush, 63,700 acres of salt desert shrub, and 670,340 acres of pinyon-juniper woodlands in the CIAA. The vegetation communities in the Project Area constitute a small percentage of this total number (approximately 1 percent).

Activities related to the Proposed Action, in addition to other actions, would add to cumulative impacts to vegetation resources in the CIAA. Actions that could also result in adverse cumulative impacts to vegetation communities include development of oil shale, coal, sodium, and other mineral resources; timber harvest; wildlife and horse management; livestock grazing; recreation and motorized vehicle travel; lands and realty decisions; and fire management. Impacts related to these actions include direct impacts such as removal of vegetation and modification of species composition and structure, and indirect impacts such as increased potential for weed invasion, increased exposure of soils to accelerated erosion, increased potential for fugitive dust, and degradation and loss of topsoil and soil microorganisms. Just as under the Proposed Action, stipulations and certain conditions of approval described in the White River RMP/ROD, and the Reclamation Plan included in Appendix B of this EA, would reduce impacts to vegetation communities.

Wildlife, Aquatic: The extent of wetlands and riparian zones, which correspond with watershed drainages in the CIAA, has not yet been fully inventoried. Based on BLM geospatial data, approximately 398 miles of linear features signifying riparian zones and wetlands occur in the CIAA. Of this number, 0.7 miles (or 0.2 percent) occur in the Project Area.

Surface disturbances that are compatible with riparian maintenance or improvement standards would generally maintain most current aquatic wildlife conditions. For example, BMPs requiring avoidance of riparian/wetland areas and implementation of a weed control and reclamation plan could minimize adverse impacts to aquatic habitats. In addition,

implementation and adherence to a SWMP and stipulations that require avoidance of fragile soils could minimize impacts related to increased erosion and sedimentation.

Overall, activities associated with the Proposed Action, would incrementally add to impacts (such as those related to increased erosion, sedimentation, and fugitive dust) from other actions in the CIAA. Actions that could also result in adverse cumulative impacts include development of oil shale, coal, sodium, and other mineral resources; timber harvest; rangeland and wild horse management; recreation and motorized vehicle travel; lands and realty decisions; and fire management.

Wildlife, Terrestrial: Assuming the Proposed Action would involve an initial disturbance of about 31 acres, the Proposed Action would constitute approximately 0.9 percent of the total anticipated oil and gas disturbance for the period 2007-2010, and approximately 0.2 percent of the total existing and proposed disturbance from oil and gas development in the CIAA. This direct loss and/or fragmentation of terrestrial wildlife habitat would likely be minimal to moderate for many non-game wildlife species, but would be expected to affect habitats for game species where oil and gas development coincides with important big game ranges (e.g., severe winter range for mule deer).

Applicant-committed protection measures (see Table 2) requiring special reclamation measures would discourage the loss or long-term modification of special big game cover types (e.g., pinyon-juniper woodlands). Further, seasonal limitations on severe winter ranges for mule deer would maintain utility of these ranges, thus ensuring that preferred cover and forage resources are available for use during sensitive times. In addition, improvements to habitat utility in the CIAA derived from BLM program integration could also be additive and result in long-term improvement trends in habitat condition; herd productivity and recruitment; and moderation of periodic population declines (BLM 1994).

Overall, activities associated with the Proposed Action would incrementally add to impacts (such as those related to reduced pinyon-juniper forage and cover areas, reduced forage quality due to potential weed infestations, and fragmentation of habitat due to increased development-related traffic and surface disturbance) from other actions in the CIAA. Other activities that could also result in adverse cumulative impacts include development of oil shale, coal, sodium, and other mineral resources; timber harvest; rangeland and wild horse management; recreation and motorized vehicle travel; lands and realty decisions; and fire management.

OTHER NON-CRITICAL ELEMENTS:

Access and Transportation: Implementation of the Proposed Action, as well as other RFD projects within the WRFO, would result in the construction of new roads, which would increase opportunities for vehicle travel or vehicle access to public lands. However, increased traffic as a result of oil and gas development and maintenance activities, coupled with recreation use, would also increase hazards to users of these roads. Opportunities for motorized vehicle use by the public would also be eliminated in certain areas over the life of the development activity.

Fire Management: The CIAA for fire management is the WRFO. The WRFO identifies approximately 307,066 acres of sagebrush and 670,340 acres of pinyon-juniper in the CIAA (BLM 1994). These vegetation communities are most susceptible to fire events.

Activities related to the Proposed Action, in addition to activities related to other actions in the CIAA, would cumulative impact fire management in the CIAA. Fuels would continue to accumulate and potentially reach late seral stages. Increased fuel loading could become a safety problem and escalate fire suppression problems. Surface disturbance and increased man-made structures associated primarily with energy development would have a negative impact on fire management by increasing the need for fire management intervention in the event of an uncontrolled fire. Such suppression activities would interfere in the proper role of fire ecology in the area.

As discussed for the Proposed Action, certain conditions of approval described in the White River RMP/ROD, which include cutting and stacking of firewood and chipping of remaining woody debris, would reduce impacts to fire management. Activities associated with the Proposed Action and Alternative B and other actions in the CIAA would have positive impacts for the public as they would increase the availability of firewood, and reduce the threat of catastrophic fire events.

Forest Management: The CIAA for forest management is the WRFO. The White River DRMP/EIS (BLM 1994), identifies approximately 50,150 acres of timberlands (Douglas fir, lodgepole pine, aspen), and 622,590 acres of woodlands (Utah juniper, pinyon pine) in the CIAA. Of the 622,590 acres of woodlands in the CIAA, 177,150 acres are considered to be commercial (BLM 1994). No timberlands occur in the Project Area. Approximately 9,411 acres of commercial pinyon-juniper woodlands occur in the Project Area (1.5 percent of the total woodlands in the CIAA).

The White River RMP/ROD limits clear cutting of woodland to 45 acres per year, or 450 acres per decade. This number has been exceeded in the past several years due to oil and gas related activities. In 2007 alone, approximately 360 acres of pinyon-juniper woodland was clear-cut. Under the Proposed Action total of 31 acres of woodland would be disturbed, which constitutes approximately 84 percent of the annual allowable harvest. Therefore implementation of the Proposed Action, when combined with other RFD activities, would likely result in continued exceedance of harvest limits.

Activities that could also result in adverse cumulative impacts to forest management include development of oil shale, coal, sodium, and other mineral resources; timber harvest; lands and realty decisions; and fire management. Impacts related to these activities include removal of woodlands and increase in woodland related pests and diseases (such as the pinyon pine beetle and the black stain root fungus).

As discussed under the Proposed Action, certain conditions of approval described in the White River RMP/ROD, which include cutting and stacking of firewood and chipping of remaining woody debris, would reduce impacts to forest management. Activities associated with the

Proposed Action, Alternative B and other actions in the CIAA would have positive impacts to the public as they would increase the availability of firewood.

Geology and Minerals: The Proposed Action would incrementally contribute to the draining of natural gas resources from beneath the Project Area and vicinity, and add six well pads to those already present in the area. The excavation of well pads and other project facilities would add to other past, present, and reasonably foreseeable actions that lead to modifications of the local topography.

In addition to the natural gas wells, it is reasonably foreseeable that development of oil shale resources would occur at some point in the future in the Piceance Basin. To date, no mining technique has proven to be economically viable for oil shale. However, in the future, mining of oil shale may become more viable as prices for oil products increase and production drops, and shale extraction technologies mature. The Project Area covers approximately 13,004 acres, or about 2.3 percent of the 900 square miles (558,000 acres) that define the Piceance Creek structural basin (Weeks et al, 1974).

Additional development of sodium resources may also occur on existing federal sodium leases to the south and southeast of the Project Area. The Proposed Action would have no cumulative impacts on the production of sodium. The Proposed Action would consume minor amounts of sand and gravel and add to the rate at which these resources are exhausted in the CIAA. Other reasonably foreseeable future activities that could result in impacts to mineral resources include livestock grazing, road improvements, and recreational activities.

Paleontology: The CIAA for paleontological resources is defined as the Project Area. Cumulative impacts to paleontological resources would primarily result from activities associated with surface and subsurface disturbance such as oil and gas development projects, recreational use/OHV travel, livestock management, and fire management. These surface-disturbing activities could have short- and long-term cumulative effects on paleontological resources in the CIAA by damaging or destroying fossils. Adverse effects include physical damage to or destruction of fossils, as well as increased vandalism and theft that result from improved access to fossil localities. An increase in the collection, vandalism, and accidental destruction of fossils would be expected as a result of the increased access to the Project Area. Any such negative impact on paleontological resources, however insignificant, would incrementally and cumulatively add to natural and human-induced paleontological resource loss in the CIAA. However, as site-specific paleontological surveys would be conducted prior to surface-disturbing activities in the Project Area, and as all identified paleontological resources would be avoided or impacts mitigated, cumulative impacts would be reduced or eliminated. Public education and, where necessary, law enforcement actions could reduce unauthorized fossil collecting.

Surface-disturbing activities could also have a beneficial effect on paleontological resources by drawing the attention of a qualified paleontologist to areas that are not currently being researched, resulting in the collection of specimens and data that would not otherwise be recovered.

Rangeland Management: The CIAA for rangeland management is the combined area of the allotments that intersect the Project Area (i.e., Yellow Creek and Square S allotments). The rangeland management CIAA covers approximately 127,241 acres, of which approximately 12,850 acres fall within the Project Area. The COGCC database shows that as of February 2008, 265 wells have either already been drilled, or are in the process of being drilled, in the rangeland management CIAA. Of these 265 wells, 103 occur in the Square S allotment, and 162 occur in the Yellow Creek allotment. The Proposed Action would add six more wells to the 265, which constitutes a 3 percent increase from what is currently shown in the COGCC database.

Activities associated with the Proposed Action would incrementally add to impacts (such as reduction in livestock forage, reduced forage quality due to potential weed infestations, and increased development-related traffic) from other actions in the CIAA. Other activities that could also result in adverse cumulative impacts include development of oil shale, coal, sodium, and other mineral resources; timber harvest; wildlife and horse management; recreation and motorized vehicle travel; lands and realty decisions; and fire management.

Realty Authorizations: Implementation of the Proposed Action, when combined with other RFD, would result in additional land use authorizations in areas that are classified as open, such as the Project Area. The degree of the impacts would depend on the future demand for land use authorizations. For example, challenges in processing ROWs would depend on the number of applications. According to the White River DRMP/EIS, land use authorizations including oil and gas development are expected to continue at the historical rate (BLM 1994). However, sudden changes in demand for, or prices of, natural gas resources could lead to fluctuations in the number of land use authorization requests on a year-to-year basis.

Recreation: The CIAA for recreational resources is the White River ERMA, which is managed to provide the public with a broad spectrum and diversity of unstructured outdoor recreational opportunities. Implementation of the Proposed Action when combined with other past, present, and RFD projects, would lead to an increased number of oil and gas pads, roads, and pipelines. This increase would diminish, and in some cases eliminate, opportunities to engage in recreation activities in a primarily natural setting.

Other activities that could also result in adverse cumulative impacts include development of oil shale, coal, sodium, and other mineral resources; timber harvest; wildlife and horse management; rangeland management; lands and realty decisions; and fire management.

Visual Resources: The CIAA for visual resources is the WRFO. Implementation of the Proposed Action combined with oil, gas, mining, roads, pipelines, vegetation manipulations, power lines, and other developments would alter the landscapes in the WRFO over the long term. As previously discussed, the entire Project Area has been classified as VRM Class III. Authorization of individually minor surface-disturbing activities in Class III areas could collectively alter the visual landscapes over the long term. However, as stated in the White River RMP/EIS (BLM 1996) cumulative impacts would not be allowed to exceed the acceptable levels of change allowed by the VRM classification system.

Wild Horses: The CIAA for wild horses is the Piceance-East Douglas HMA. This CIAA covers approximately 190,130 acres, of which approximately 8,442 acres (or 4 percent) are within the Project Area. The COGCC database shows that as of February 2008, 313 wells have been drilled (past or present exploration), or will be drilled in the CIAA. The Proposed Action would add six more natural gas wells to these 313 wells, which would constitute a 3 percent increase in well count from what was listed in the COGCC database as of February 2008. In the short-term, oil and gas development in the CIAA would reduce pinyon-juniper cover for wild horses, whereas long-term negative impacts to wild horses in the CIAA would result from physical and spatial disturbances associated with development and maintenance of oil and gas production (BLM 1994).

Activities associated with the Proposed Action would incrementally add to impacts (such as those related to reduced pinyon-juniper cover areas, reduced forage quality due to potential weed infestations, and fragmentation of habitat due to increased development-related traffic and surface disturbance) from other actions in the CIAA. Other activities that could also result in adverse cumulative impacts include development of oil shale, coal, sodium, and other mineral resources; timber harvest; rangeland and wildlife management; recreation and motorized vehicle travel; lands and realty decisions; and fire management.

PERSONS/AGENCIES CONSULTED: None

INTERDISCIPLINARY REVIEW:

Project Team		
Name	**Title**	**Area(s) of Responsibility**
BLM Oversight		
Lisa Belmonte	Wildlife Biologist	Migratory Birds, including Raptors; Threatened, Endangered and Sensitive Animal Species
Linda Jones	Realty Specialist	Land and Realty
Chris Ham	Social & Physical Sciences Staff Supervisor	Access and Transportation; Recreation; Wilderness; Visual Resources
Ed Hollowed	Wildlife Biologist	Migratory Birds, including Raptors; Threatened, Endangered and Sensitive Animal Species; Wildlife; Wetlands and Riparian Zones
Mark Hafkenschiel	Rangeland Management Specialist	Vegetation, Invasive, Non-native Species, Rangeland Management
Ken Holsinger	Botanist	Threatened, Endangered and Sensitive Plant Species; Forest Management
Melissa Kindall	Range Technician	Wild Horses
Bob Lange	Hydrologist	Air Quality, Wastes (Hazardous or Solids), Water Quality (Surface and Ground), Hydrology and Water Rights, and Soils.
Jim Michels	Fire/Fuels Technician	Fire Management
Paul Daggett	Mining Engineer	Geology and Minerals
Michael Selle	Archaeologist	Cultural Resources, Paleontological Resources
Thane Stranathan	Natural Resource Specialist	Reclamation and Revegetation

Project Team		
Name	**Title**	**Area(s) of Responsibility**
Buys & Associates, Inc., Littleton Colorado (Third Party Contractor)		
Tyler Ashcroft	Environmental Planner	Assistant Project Manager; Access and Transportation; Realty; Recreation; Visual Resources
Don Douglas	Senior Scientist	Air Quality
Melissa Bridendall	NEPA Resource Specialist, Wildlife	Migratory Birds; Threatened, Endangered and Sensitive Animal Species; Wildlife; Wild Horses
Kristin Brown	Hydrogeologist	Stormwater Management; Water Quality
Shina duVall	Archaeologist	Cultural and Paleontological Resources
Karin McShea	Botanist	Invasive, Non-native Species; Threatened, Endangered and Sensitive Plant Species; Vegetation; Fire Management Forest Management; Rangeland Management; Reclamation Plan
Dave Nicholson	Senior Geologist	Water Quality, Surface and Ground; Wetlands and Riparian Zones; Soils; Geology and Minerals; Hydrology
Jean Sinclear	NEPA Specialist	B&A NEPA Project Lead
Mark Weitz	GIS	Map Preparation and Spatial Data Analysis and Interpretation

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Finding of No Significant Impact/Decision Record (FONSI/DR)

CO-110-2007-203-EA

FINDING OF NO SIGNIFICANT IMPACT (FONSI)/RATIONALE: The environmental assessment and analysis of the environmental effects of the proposed action have been reviewed. The approved mitigation measures (listed below) result in a Finding of No Significant Impact on the human environment. Therefore, an environmental impact statement is not necessary to further analyze the environmental effects of the proposed action.

Buys and Associates, an environmental consulting firm, with the guidance, participation, and independent evaluation of the Bureau of Land Management (BLM) prepared this document. The BLM, in accordance with 40 CFR 1506.5 (a) and (c), is in agreement with the findings of the analysis and approves and takes responsibility for the scope and content of this document.

DECISION/RATIONALE: It is my decision to approve the proposed action, including BOPCO's applicant-committed protection measures (Table 2 included below), reclamation plan and stormwater management plans with the mitigation measures listed below.

MITIGATION MEASURES:

1. All access roads will be treated with water and/or a dust suppressant during construction and drilling activities so that there is not a visible dust trail behind vehicles. All vehicles will abide by public speed restrictions during all activities. Company-set speed restrictions will not exceed 15 miles per hour. If water is used as a dust suppressant, there will be no traces of oil or solvents in water. Dust abatement will not be used as a water disposal option under any circumstances.

2. The operator is responsible for informing all persons who are associated with the project operations that they will be subject to prosecution for knowingly disturbing historic or archaeological sites, or for collecting artifacts. If historic or archaeological materials are uncovered during any project or construction activities, the operator is to immediately stop activities in the immediate area of the find that might further disturb such materials, and immediately contact the authorized officer (AO). Within five working days the AO will inform the operator as to:
    - whether the materials appear eligible for the National Register of Historic Places
    - the mitigation measures the operator will likely have to undertake before the site can be used (assuming in situ preservation is not necessary)
    - a timeframe for the AO to complete an expedited review under 36 CFR 800-11 to confirm, through the State Historic Preservation Officer, that the findings of the AO are correct and that mitigation is appropriate.

    If the operator wishes, at any time, to relocate activities to avoid the expense of mitigation and/or the delays associated with this process, the AO will assume responsibility for

whatever recordation and stabilization of the exposed materials may be required. Otherwise, the operator will be responsible for mitigation cost. The AO will provide technical and procedural guidance for the conduct of mitigation. Upon verification from the AO that the required mitigation has been completed, the operator will then be allowed to resume construction.

3. Pursuant to 43 CFR 10.4(g) the holder of this authorization must notify the AO, by telephone, with written confirmation, immediately upon the discovery of human remains, funerary items, sacred objects, or objects of cultural patrimony. Further, pursuant to 43 CFR 10.4(c) and (d), the operator must stop activities in the vicinity of the discovery and protect it for 30 days or until notified to proceed by the authorized officer.

4. Prior to surface-disturbing activities, BOPCO and/or their contractors will determine and report, consistent with BLM White River Field Office raptor nest survey protocols, if active/occupied raptor nests are present within ¼ mile of proposed development sites. Nesting activity that has potential to be adversely influenced by well or access development will be subject to BLM-imposed Conditions of Approval that meet the intent of appropriate nest protection stipulations NSO-02/03 and TL-01/03 as established in the 1997 White River Resource Management Plan

5. To minimize the potential for vehicle collisions with raptors, BOPCO will advise project personnel regarding appropriate speed limits in the Project Area, and CDOW will be contacted regarding the presence of carrion within or along roadways.

6. Prior to surface-disturbing activities, BOPCO and/or their contractors will determine if active/occupied raptor nests are present within ¼ mile of proposed development sites. In the event raptor nesting activity is found in close proximity to proposed developments or project-related activity (i.e., undetected in earlier surveys or found in subsequent years), surface features may be subject to relocations of up to 200 meters and development activity deferred during the period from nest establishment until young have successfully fledged and dispersed from the nest stand.

7. The release of any chemical, oil, petroleum product, produced water, or sewage, etc, (regardless of quantity) must be reported by the lease holder, to the Bureau of Land Management – WRFO Hazardous Materials Coordinator at (970) 878-3800.

8. The operator will submit via sundry order the method of handling produced water from completed wells, as per Onshore Order no.7.

9. Water-based drilling mud and completion fluids will be recycled to minimize the need for proper disposal. Produced water during drilling and completion activities will be cleaned and tested for reuse to minimize the volume that needs to be disposed. Disposal of all water will be in strict conformance with established rules and regulations relating to the Clean Water Act and existing Federal and state water quality requirements.

10. Construction debris and general wastes will be managed as solid waste and disposed of at approved disposal facilities permitted by the State of Colorado. Receptacles will be provided for the collection of wastes generated during construction and operations.

11. All pipelines will be hydrostatically tested to ensure integrity in accordance with current industry standards (American Society of Mechanical Engineers [ASME] B31.4 and B31.8) and with current Federal regulations. All hydrostatic test water will be tested to meet current water quality standards before being properly disposed at an approved facility.

12. Provide for erosion-resistant surface drainage by adding necessary drainage facilities and armoring prior to fall rain or snow. When erosion is anticipated, sediment barriers shall be constructed to slow runoff, allow deposition of sediment, and prevent it from leaving the site. In addition, straining or filtration mechanisms may also contribute to sediment removal from runoff.

13. Locate culverts or drainage dips in such a manner as to avoid discharge onto unstable terrain such as headwalls or slumps. Do not use culverts smaller than 18 inches in diameter. Provide adequate spacing to avoid accumulation of water in ditches or road surfaces. Monitor culvert installations to ensure adequate armoring of inlet and outlet and no erosion of design. Patrol areas susceptible to road or watershed damage during periods of high runoff.

14. The operator will submit a design for the rock check dams to be used as part of the stormwater measures. The design should include the type of rock, fabric or other materials to be used, shape and height of the dams and maintenance planned.

15. The catchbasin on YCF 4-44-1 will maintain a 2-foot freeboard and should be monitored after storm events.

16. Keep road inlet and outlet ditches, catch basins, and culverts free of obstructions, particularly before and during spring runoff. Routine machine-cleaning of ditches should be kept to a minimum during wet weather. Leave the disturbed area in a condition that provides drainage with no additional maintenance.

17. A Reclamation Status Report will be submitted to the WRFO biannually for all actions that require disturbance of surface soils on BLM-administered lands as a result of the Proposed Action. Actions may include, but are not limited to, well pad and road construction, construction of ancillary facilities, or power line and pipeline construction. The Reclamation Status Report will be submitted by May 15 and November 15 of each calendar year, and will include the well number, legal description, project description (e.g., well pad or pipeline), reclamation status (e.g., interim or final), whether the well pad or pipeline has been re-vegetated and/or re-contoured, date seeded, photos of the reclaimed site, estimate of acres seeded and seeding method (e.g., disk-plowed, drilled, or both). Internal and external review of this plan and the process used to acquire the necessary information will be conducted annually, and new information or changes in the reporting process will be incorporated into the plan. The Reclamation Status Report will be submitted electronically via email as a Microsoft Excel table to Natural Resource Specialist, Brett Smithers (brett_smithers@blm.gov).

18. The YCF 11-41 and YCF 12-32-1 locations will be subject to timing limitations designed to reduce the extent and intensity of disturbance on mule deer severe winter ranges. No disruptive activities, including but not limited to pad/road/pipeline construction, drilling and completion operations, and installation of production equipment will be allowed between 1 January and 30 April.

19. During reclamation, protective fences will be installed around reseeded well pads to reduce the possibility of foraging by wild horses and livestock, thereby allowing for proper vegetation reestablishment. Protective fences will be built to current Type-D BLM fence standards. These fences will be maintained until the reseeded areas achieve the desired density and are mature enough to withstand the pressure of foraging.

20. To limit unrestricted vehicular use on access routes on deer winter ranges, the proponent will be responsible for installing and maintaining locked gates (with wings as necessary) to limit vehicular access on those routes associated with proposed location YCF 4-44-1. Access to the proposed YCF 11-41-1 and YCF 12-32-1 locations currently originates from gated access to the YCF 1-35-1 location. Access on these roads will be strictly limited to those persons directly associated with well development, maintenance, and production on a year-round basis.

21. Woody material to be removed from the site will be stock piled to a size not exceeding 5 tons of wood per acre.

22. Excess woody material will be treated in one of the following methods:
    - A hydro-ax or other mulching type machine may be used to remove the trees.
    - Cut trees and have them removed for firewood, posts, or other products. If this treatment is used the branches and tops will be mulched with a chipper or lopped and scattered to a depth of 24 inches or less. If the products are left for collection by the general public, they will be stacked in small manageable piles along the roadside or pad to facilitate removal.

23. During construction of roads, pipelines and the well pad, there shall be one 10 lb A/B/C rated fire extinguisher, one shovel and/or Pulaski or axe for each piece of equipment on site and ready for use in the event of an accidental fire ignition as a result of construction. No fire suppression actions shall be taken on any other fires in the area unless directed by the incident commander. In the event of an accidental ignition or other fire in the area, the contractor or a representative will contact Craig Fire Dispatch at 970-878-5037 so that a qualified fire crew can evaluate the situation for the safety of all crews in the area.

24. At least 48 hours prior to any construction of the well pad, access road, and pipeline associated with YCF 11-41-1 and YCF 12-32-1, a BLM Natural Resource Specialist (contact 970-878-3800) will be notified and a monitor will be on site to ensure old-growth trees are avoided.

25. The operator is responsible for informing all persons who are associated with the project operations that they will be subject to prosecution for knowingly disturbing paleontological

sites, or for collecting fossils. If fossil materials are uncovered during any project or construction activities, the operator is to immediately stop activities in the immediate area of the find that might further disturb such materials, and immediately contact the authorized officer (AO). Within five working days the AO will inform the operator as to:

- whether the materials appear to be of noteworthy scientific interest
- the mitigation measures the operator will likely have to undertake before the site can be used (assuming in situ preservation is not feasible)

If the operator wishes, at any time, to relocate activities to avoid the expense of mitigation and/or the delays associated with this process, the AO will assume responsibility for whatever recordation and stabilization of the exposed materials may be required. Otherwise, the operator will be responsible for mitigation cost. The AO will provide technical and procedural guidelines for the conduct of mitigation. Upon verification from the AO that the required mitigation has been completed, the operator will then be allowed to resume construction.

26. An approved paleontological monitor shall be present anytime it becomes necessary to excavate into the underlying rock formation to construct the road, level the well pad, excavate the reserve/blooie pit or bury any of the associated pipelines to the well.

27. Where the proposed joint access road to YCF 11-41-1 and YCF 12-32-1 crosses the existing pasture boundary fence, install a minimum 20-foot wide cattleguard to BLM specifications for the lifetime of the project. All cattleguard/fence installation will take place prior to well location, pipeline or facility construction. A minimum 16-foot wide gate will be installed next to the cattleguard to allow passage for livestock/heavy equipment. All fence construction will be completed to BLM specifications.

28. To offset possible interference or disruption of livestock grazing patterns and distributions, BOPCO could work with the BLM and individual grazing permittees to identify and construct additional surface water structures, e.g., water catchments, stock water tanks, etc.

29. Authorization of off-lease access roads is required before construction of the well pad may begin. The holder is responsible for obtaining appropriate permits from State and local governments including Rio Blanco County and CDOW.

30. Prior to surface-disturbing activities, BOPCO and/or their contractors will determine if pregnant mares are present in the vicinity of proposed development sites. If BLM determines wild horses are in the vicinity of proposed development, development activities may be delayed for a specified 60 day period within the spring foaling period between March 1 and June 15. The lessee may also be required to perform special conservation measures within this area including: 1) Habitat improvement projects in adjacent areas if development displaces wild horses from critical habitat, 2) disturbed watering areas will be replaced with an equal source of water having equal utility, and 3) activity/improvements will provide for unrestricted movement of wild horses between summer and winter ranges.

31. Horseproof cattle guards will be constructed and maintained, as directed by the BLM, to reduce the potential for injuries to wild horses. Specifically, sucker rod or rebar will be tack

welded (centered between the equally spaced rails) to each cross member for the entire length and width of the cattle guard. When driven across, the floor of the cattle guard will collapse level with the terrain, and will slowly retrieve upon exiting. Horseproof cattle guards will be painted a dark color to help with snow melt.

32. In wild horse use areas, open trenches for burial of gathering and water pipelines will be inspected daily to reduce the potential for horses to become trapped should they fall into a trench.

33. Promptly revegetate all disturbed areas with Native Seed mix #3. Drill seeding is the preferred method of seeding. If seed is broadcast, double the seeding rate and provide for seed coverage by harrowing or dragging after seed application. Table rates are PLS pounds per acre. No debris will be scattered on the pipeline right of way until after seeding operations are complete.

Native Seed mix #3		
Western wheatgrass (Rosanna)	2	Gravelly 10"-14", Pinyon/Juniper
Bluebunch wheatgrass (Whitmar)	1	Woodland, Stony Foothills, 147
Thickspike wheatgrass (Critana)	1	(Mountain Mahogany)
Indian ricegrass (Rimrock)	2	
Fourwing saltbush (Wytana)	1	
Utah sweetvetch	1	
Alternates: Needle and thread, globemallow		

34. The operator will be required to monitor the project area for the life of the project and eradicate all noxious and invasive species which occur on site using materials and methods approved in advance by the Authorized Officer.

COMPLIANCE/MONITORING: On-going compliance inspections and monitoring of drilling, production and post-production activities will be conducted by White River Field Office staff during construction of well pads, access roads, and pipelines. Specific mitigation developed in this Environmental Assessment and the lease terms and conditions will be followed. The operator will be notified of compliance-related issues in writing, and depending on the nature of the issue(s), will be provided 30 days to resolve such issues.

NAME OF PREPARER: Jay Johnson, Natural Resources Specialist/ Buys & Associates

NAME OF ENVIRONMENTAL COORDINATOR: Caroline Hollowed

SIGNATURE OF AUTHORIZED OFFICIAL: Field Manager

DATE SIGNED: 29 July 2008

ATTACHMENTS: Table 2: Applicant-Committed Protection Measures
Figure 1: General Map of Proposed Action
Appendices A - F

Table 2: Applicant-Committed Protection Measures for BOPCO's Proposed 6 Wells

Applicant-Committed Protection Measures	Applicable Well Number – YCF-					
	4-44-1	11-41-1	12-32-1	28-23-1	28-44-1	32-12-1
General						
Minimize new surface disturbance by limiting new surface disturbance to that area within a staked area. Temporary staging areas, vehicle parking areas, etc., would be limited to existing disturbed areas. All vehicle traffic would be restricted to existing roads; no cross-country vehicle travel would be conducted.	X	X	X	X	X	X
All disturbed areas would be reclaimed in accordance with the reclamation plan as set out in **Appendix B** herein and in the Surface Use Plan of the APD filed for each proposed well.	X	X	X	X	X	X
Restrict travel by the public on access roads determined by the BLM to be inconsistent with existing travel plans or resource management plans. Lockable gates, signs, fence segments, barricades or other forms of deterrents would be constructed and maintained as directed by the BLM.	X	X	X			
Roads would be located to minimize their effect on wetland and riparian areas. Design criteria would include approaching and crossing the channel perpendicular to, and in well-defined, unobstructed and straight segments of the channel. Drainages would be crossed preferably using a low-water crossing.		X				
Any needed fences would be constructed in conformance with BLM Manual H1737-1, as updated. Type-D fences would be constructed to protect reclaimed areas, wetland and riparian areas, or as directed by the BLM. Needed fences would be located so as to minimize livestock, big game and/or wild horse free movement in the Project Area. Fence lines would not be bladed prior to construction. See also reclamation section of this EA for additional information (**Appendix B**).	X	X	X	X	X	X
During dry periods, fugitive dust from construction and operations activities on well pads, along pipeline and access road ROWs would be controlled by routine watering.	X	X	X	X	X	X
Cultural and Paleontological Resources						
Surveys for paleontological resources would be conducted on Class I and Class II geologic units if they have good, safe outcrops likely to produce scientifically-important fossils prior to any surface-disturbing activities.	X	X	X	X	X	X
If any fossils, human skeletal remains or cultural remains, monuments or sites are unearthed during project operations, all such operations would cease immediately and BLM would be notified. BOPCO would comply with BLM directions.	X	X	X	X	X	X
Invasive, Non-Native Species						
Application of all pesticides and herbicides would be in accordance with BLM Manual H-9011-1 and 9015, as amended, and the approved Pesticide Use Proposal. Application would be under the field supervision of an Environmental Protection Agency-certified pesticide applicator.	X	X	X	X	X	X

Applicant-Committed Protection Measures	Applicable Well Number – YCF-					
	4-44-1	11-41-1	12-32-1	28-23-1	28-44-1	32-12-1
All operator, contractors and subcontractors would be required to clean their equipment and vehicles prior to using them in the Project Area.	X	X	X	X	X	X
Areas disturbed by the Proposed Action would be monitored for the presence, extent and trend of invasive, non-native species.	X	X	X	X	X	X
Migratory Birds, Including Raptors						
Minimize disruption of migratory bird nesting activity in mature pinyon-juniper woodlands by scheduling access and pad construction, and where possible, drilling and completion operations to periods outside core nesting season (May 15 to July 15).	X	X	X			
Prevent use by migratory birds of areas expected to store fluids which may pose a risk to such birds. Netting or other alternative method acceptable to BLM would be used. Notify BLM 2 weeks prior to installation. Netting would be applied within 24 hours after the drill rig is removed and will be maintained in a fully function condition until the pit is backfilled. Any lethal and non-lethal events involving migratory birds will be immediately reported to the BLM.	X	X	X	X	X	X
Water Quality						
Utilize appropriate road survey designs to minimize surface disturbance and reduce sedimentation. Employ appropriate guidelines set out in the BLM's 2007 "Gold Book" and standard engineering road designs specified by BLM Manual Section 9113 and industry standards for road shape and drainage features. Culverts and waterbars would be installed according to BLM Manual 9113 standards and sized for the 10-year storm event with no static head and to pass a 25-year event without failing.	X	X	X	X	X	X
Installation of pipelines would involve the following: place pipeline with proposed/existing road ROW; bury the pipeline to a minimum depth of 36 inches; install water bars and/or other sediment barriers to slow runoff and allow for deposition of sediment.	X	X	X	X	X	X
Floodplains, Riparian and Wetlands						
Fences would be constructed to protect natural wetlands and streambanks.						X
Soils						
Minimize travel on roads to that which is essential when soils or road surfaces become saturated to a depth of 3 inches or greater.	X	X	X	X	X	X
Avoid headwalls, midslope locations on steep, unstable slopes, seeps, oil landslides, slopes in excess of 70 percent and areas where the geologic bedding planes or weathering surfaces are inclined with the slope.	X	X	X	X	X	X
Minimize soil erosion and surface runoff through adherence to well-specific stormwater management actions	X	X	X	X	X	X
Vegetation						
When preparing a site, all suitable topsoil would be stripped from the surface and stockpiled separately from other excess materials piles.	X	X	X	X	X	X

Applicant-Committed Protection Measures	Applicable Well Number – YCF-					
	4-44-1	11-41-1	12-32-1	28-23-1	28-44-1	32-12-1
Topsoil piles will be protected by reseeding with site-specific native seed mixtures, and covered with erosion control blankets, if appropriate. If the topsoil is stockpiled on slopes exceeding 5 percent, a berm would be constructed below the stockpile.	X	X	X	X	X	X
Forest Management						
In pinyon-juniper woodlands, avoid mature trees suitable as future "seed" trees, minimize removal of trees. Snags, including dead or dying trees, will be avoided within the interior of woodland areas.	X	X	X			X
Trees that must be removed for well pads would be purchased from the BLM. They would then be cut to a maximum stump height of 6 inches and disposed of as follows: trees would be cut into four foot lengths and removed from the Project Area. Any remaining limbs less than 4 inches diameter would be chipped and scattered on reclaimed areas or scattered off the disturbed area.	X	X	X			X
In areas where the pipeline ROWs intersect travel routes, retain enough of the in-place woody material to sufficiently deter travel. Utilize the cleared tree boles that have been limbed, with root wads intact, and place in areas where the use of existing pinyon-juniper stands will assist in the deterrence. Retain enough of these materials to cover 20 percent of the surface area to be closed. Any excess materials other than that needed for the 20 percent cover, will be cut into 4-foot sections and placed along roads to discourage the use of pipeline ROWs for firewood collection. The root wads from the cut sections would be redistributed along the ROW.	X	X	X	X	X	X
Old-growth trees identified by the BLM would not be cut, disturbed or trimmed in any way during road and/or pipeline construction or during any activities undertaken by BOPCO.		X	X			
Wildlife, Terrestrial						
To reduce the extent and intensity of disturbance on mule deer severe winter ranges, no disruptive activities, including but not limited to pad/road/pipeline construction, drilling and completion operations, and installation of production equipment would be allowed between January 1 and April 30.		X	X			

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